UNALLOYED, UNWROUGHT ZINC

Report to the President on Investigation TA-201-31 Under Section 201 of the Trade Act of 1974

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UNITED STATES INTERNATIONAL TRADE COMMISSION

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USITC FINDS U.S. INDUSTRY NOT SERIOUSLY INJURED BY IMPORTS OF UNALLOYED, UNWROUGHT ZINC

The United States International Trade Commission today reported to the President its determination, by a 5-to-1 vote, that the domestic industry is not being seriously injured or threatened with serious injury by imports of unalloyed, unwrought zinc.

Commissioners Joseph O. Parker, George M. Moore, Catherine Bedell, Italo H. Ablondi, and Bill Alberger made the negative injury determination, while Commissioner Daniel Minchew found in the affirmative.

The Commission began its investigation on December 29, 1977, under section 201 of the Trade Act of 1974. The complaint was filed by the Lead-Zinc Producers Committee, which claimed that zinc imports are injuring the domestic industry.

Unalloyed, unwrought zinc (slab zinc) is refined zinc metal most commonly cast in 55-pound slabs or large blocks weighing from 500 to 2,400 pounds. Its most important uses are in galvanizing and zinc-diecasting alloys. Galvanized steel products are widely used in construction, automobiles, and appliances

more

and accounted for 37 percent of slab zinc consumption in 1977. Zinc diecastings are used extensively as automobile parts and hardware and accounted for about 34 percent of slab zinc consumption last year.

In 1977, domestic slab zinc producers employed about 3,100 production workers, and 35 companies, employing some 4,800 production workers, mined ore and produced zinc concentrates. The U.S. industry produced 502,000 short tons of primary and secondary zinc last year; the capacity utilization rate for the industry was 71 percent.

Imports during 1977 totaled 555,000 short tons valued at $359 million. The principal sources of imports and their shares of total imports were Canada, 43 percent; West Germany, 8 percent; Belgium, 7 percent; and Zaire, Finland, and Mexico, 6 percent each.

The Commission's report, Unalloyed, Unwrought Zinc (USITC Publication 894), contains the views of the Commissioners and information developed in the investigation (No. TA-201-31). Copies may be obtained by calling (202) 523-5178 or from the Office of the Secretary, 701 E Street NW., Washington, D.C. 20436.

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C O N T E N T S

CONTENTS

Figures

CONTENTS

Tables

Note.--The whole of the Commission's report to the President may not be made public since it contains certain information that would result in the disclosure of the operations of individual concerns. This published report is the same as the report to the President, except that the above mentioned information has been omitted. Such omissisons are indicated by asterisks.

SUMMARY

Investigation No. TA-201-31 was instituted by the Commission on December 29, 1977, following receipt of a petition filed on December 20, 1977, by the Lead-Zinc Producers Committee on behalf of U.S. producers of unalloyed, unwrought zinc. The imported article covered in the scope of this investigation is unwrought zinc, other than alloys of zinc, provided for in item 626.02 of the Tariff Schedules of the United States (TSUS).

Unalloyed, unwrought zinc (slab zinc) is refined zinc metal most commonly cast in 55 pound slabs or large blocks weighing from 500 to 2,400 pounds. Zinc ores and concentrates are converted into slab zinc either by the electrolytic method, where zinc metal is taken from solution and electrodeposited on cathodes, or by the use of vertical retorts (furnaces) which use heat to reduce concentrates to a metal vapor which is then passed through condensers which convert it to liquid metal.

At present, the most important uses of slab zinc are in galvanizing and in zinc-diecasting alloys. Galvanized steel products, which are widely used in construction, automobiles, and appliances, accounted for 37 percent of slab zinc consumption in 1977. Zinc diecastings are used extensively as automobile parts and hardware. Use of zinc in die-cast alloys accounted for about 34 percent of slab zinc consumption.

In 1977, there were six domestic producers of primary slab zinc employing about 3,100 production workers, which represents a 24-percent decline in workers since 1973. In addition, 35 companies were engaged in the mining of ore and the production of zinc concentrates. These companies employed about 4,800 production workers, which represents a 5-percent decline since 1974.

Imports for consumption of slab zinc declined from 587,000 short tons in 1973 to 375,000 short tons in 1975, increased to 695,000 short tons in 1976, and then declined to 555,000 short tons in 1977. The ratios of imports to production increased from 88 percent in 1973 to 123 percent in 1976, and then declined in 1977 to 111 percent. Principal sources of imports in 1977 were Canada (43 percent), West Germany (8 percent), Belgium (7 percent), Zaire (6 percent), Finland (6 percent), and Mexico (6 percent).

U.S. production of primary slab zinc declined from 1969 to 1975, then increased slightly in 1976. Production in 1977 declined to a 10-year low of 450,000 short tons. Production of secondary zinc declined from 1973 to 1975, increased slightly in 1976, then declined to a 10-year low of 52,000 short tons in 1977. The ratio of U.S. imports to consumption increased from 39 percent in 1973 to 61 percent in 1976, then declined to 50 percent in 1977. The capacity utilization rate for primary and secondary producers reached a 10-year high in 1973 of 85 percent, then declined to 69 percent in 1975. Utilization recovered in 1976, but declined again to 71 percent in 1977.

During 1968-75, domestic slab zinc production capacity declined from 1.3 million short tons to 723,000 short tons. This decline in capacity is attributable to the closing of eight smelting and refining plants. 1/ In the case of these closings, the age of the facilities, costs of complying with pollution control regulations, and inability to secure adequate supplies of raw materials were cited as reasons for closing.

Total inventories of slab zinc increased from 175,000 short tons in 1973 to 304,000 short tons in 1977. Producers' inventories increased from 34,000 short tons to 118,000 short tons; importers' inventories increased from 27,000 short tons to 99,000 short tons. Consumers inventories declined from 121,000 short tons in 1976 to 87,000 short tons in 1977. Exports, as reported by the Department of Commerce, declined from 19,000 short tons in 1974 to less than 500 short tons in 1977.

Average net prices for imported and U.S.-produced slab zinc increased steadily during 1973. Import prices peaked in the first quarter of 1974 and then generally declined through the remainder of 1974 and through 1975. U.S. producer prices did not peak until the fourth quarter of 1974 and remained below imported prices until the fourth quarter of 1975. Prices in 1976 were relatively stable with only slight differences between imported and U.S.-produced slab zinc prices. This difference widened somewhat in 1977 as both prices began downward slides with import prices averaging about 4 percent less than U.S. producer prices. The weighted average net price for imported Special High Grade (SHG) slab zinc peaked at 48.0 cents per pound in the first quarter of 1974 then declined to 29.7 cents per pound in the fourth quarter of 1977 The weighted average net price for U.S.-produced SHG slab zinc peaked at 40.2 cents per pound in the fourth quarter of 1974 than declined to 30.8 cents per pound in the fourth quarter of 1977.

Net operating profits of six U.S. primary slab zinc producers and two secondary producers on their slab zinc operations increased from $20.3 million in 1973 to $48.7 million in 1974, declined to $3.6 million in 1975, increased to $10.0 million in 1976 then declined to a loss of $11.4 million in 1977. As a percentage of net sales, net operating profit was 7.7 percent in 1973, and 12.0 percent in 1974. The net loss in 1977 was 4.0 percent of net sales.

Net operating profit of nine U.S. mining companies on their zinc concentrate operations declined from $59.5 million in 1974 to $25.7 million in 1976. The mine operators incurred operating losses of $311,000 in 1977.

1/ National Zinc's plant was converted from a horizontal retort process to an electrolytic process. American Zinc's plant at Sauget, Ill. was reopened in 1973 by AMAX.

REPORT TO THE PRESIDENT

United States International Trade Commission,
June 20, 1978.

To the President:

In accordance with section 201(d)(1) of the Trade Act of 1974 (88 Stat. 1978), the United States International Trade Commission herein reports the results of an investigation relating to unalloyed, unwrought zinc.

The investigation to which this report relates (investigation No. TA-201-31) was undertaken to determine whether--

> unwrought zinc, other than alloys of zinc, provided for in item 626.02 of the Tariff Schedules of the United States,

is being imported into the United States in such increased quantities as to be a substantial cause of serious injury, or the threat thereof, to the domestic industry producing an article like or directly competitive with the imported article.

The Commission instituted the investigation under the authority of section 201(b)(1) of the Trade Act on December 29, 1977, following receipt, on December 20, 1977, of a petition for import relief under section 201 filed by the Lead-Zinc Producers Committee.

The Commission held a public hearing on this matter in Washington, D.C., March 21-24, 1978. All interested parties were given an opportunity to be present, to present evidence, and to be heard.

Notice of the institution of the investigation and of the public hearing was published in the Federal Register of January 5, 1978 (43 F.R. 31015).

The information in this report was obtained from fieldwork; questionnaires sent to domestic producers, importers, and consumers; the Commission's files; information

obtained in the course of the public hearing; briefs submitted by interested parties; and other Government agencies.

A transcript of the hearing and copies of briefs submitted by interested parties in connection with the investigation are attached. 1/

1/ Attached to the original report sent to the President, and available for inspection at the U.S. International Trade Commission, except for material submitted in confidence.

DETERMINATION OF THE COMMISSION

On the basis of the investigation, the Commission determines (Commissioner Minchew dissenting) that unwrought zinc, other than alloys of zinc, provided for in item 626.02 of the Tariff Schedules of the United States, is not being imported into the United States in such increased quantities as to be a substantial cause of serious injury, or the threat thereof, to the domestic industry producing an article like or directly competitive with the imported article.

Views of Commissioners George M. Moore, Catherine Bedell, and Italo H. Ablondi

On December 20, 1977, the United States International Trade Commission received a petition requesting an investigation under section 201(b)(1) of the Trade Act of 1974 with respect to imports of unalloyed, unwrought zinc. On December 29, 1977, the Commission instituted an investigation to determine whether unwrought zinc, other than alloys of zinc, provided for in item 626.02 of the Tariff Schedules of the United States (TSUS), is being imported into the United States in such increased quantities as to be a substantial cause of serious injury, or the threat thereof, to the domestic industry producing an article like or directly competitive with the imported article.

Section 201(b)(1) of the Trade Act requires that each of the following criteria be met if the Commission is to make an affirmative determination in this investigation and thus find a domestic industry eligible for import relief:

(1) Imports of the article concerned are entering the United States in increased quantities;

(2) The domestic industry producing an article like or directly competitive with the imported article is being seriously injured or threatened with serious injury; and

(3) Increased imports are a substantial cause of the serious injury, or the threat thereof, to the domestic industry producing an article like or directly competitive with the imported article concerned.

Determination

On the basis of the information before the Commission in this investigation, we have determined that unwrought zinc, other than alloys of zinc, provided for in item 626.02 of the TSUS, is not being imported into

the United States in such increased quantities as to be a substantial cause of serious injury, or the threat thereof, to the domestic industry producing an article like or directly competitive with the imported article. Specifically, we find that the third criterion has not been satisfied, i.e., that increased imports are not a substantial cause of such injury or threat thereof.

The domestic industry

In this investigation, we have concluded that the domestic industry producing an article like or directly competitive with the imported article which is the subject of this investigation consists of the domestic facilities employed in the mining of zinc and the production of unalloyed, unwrought zinc (hereinafter "slab zinc" or "zinc"). In 1977, there were six domestic producers of primary zinc, eleven producers of secondary zinc, and thirty-five firms engaged in zinc mining operations. 1/ Several of the firms were engaged in more than one type of zinc operation.

Imports not a substantial cause of injury

Increased imports. Imports of slab zinc decreased from 587,000 short tons in 1973 to 375,000 short tons in 1975, rose to 695,000 short tons in 1976 and then decreased to 555,000 short tons in 1977. The trend line for the 5-year period 1973-77 shows imports (in tons) increased slightly.

The ratio of imports to production declined from 88 percent in 1973 to 76 percent in 1975, increased to 123 percent in 1976 and then declined to 111 percent in 1977. The trend line of the ratios of imports

1/ A "primary" producer produces primarily from ore or concentrates. A "secondary" producer produces from scrap.

to production shows more of an increase than the slight rise in the trend line of actual imports.

Serious injury, or the threat thereof. The second criterion requires a finding of whether the domestic industry is being seriously injured, or threatened with serious injury. The Trade Act does not expressly define the term "serious injury," but instead sets forth certain guidelines in the form of economic factors to be used in determining whether the criterion is satisfied. Thus, section 201(b)(2) provides that the Commission, in determining whether "serious injury" exists, should take into account all economic factors which it considers relevant, including but not limited to--

(1) the significant idling of productive facilities in the industry;

(2) the inability of a significant number of firms to operate at a reasonable level of profit; and

(3) significant unemployment or underemployment within the industry.

A significant part of the productive facilities of slab zinc producers are idle. Only about 70 percent of domestic productive capacity was in use in 1977, in comparison with the 85 percent level of 1973.

A significant number of firms in the industry are unable to operate at a reasonable level of profit. For the six primary producers and two secondary producers, the ratio of operating profits to sales on their zinc operations fell from 7.7 percent in 1973 to 2.9 percent in 1976 and to a loss of 4 percent in 1977. The majority of the eight firms showed a loss in 1977 on their zinc operations. The profit-and-loss

experience of 9 U.S. mining companies reveals a sharp increase in net operating ratios for zinc concentrates in 1974 when demand for concentrates was high. The ratio of operating profits to sales dropped off in 1975 and continued to decline until negative returns were recorded in 1977.

There is significant unemployment or underemployment in the domestic industry. The total number of slab zinc production and related workers was 3,141 in 1977, about 23 percent fewer than in 1973. The total number of man-hours worked by production and related workers in 1977--6.2 million--was about 28 percent lower than the 1973 level.

The total number of production and related workers engaged in the mining and milling of zinc was 4,820 in 1977, about 4 percent fewer than in 1974. The total number of man-hours worked by these employees in 1977--7.6 million--was about 9 percent lower than the 1974 level. As of March 30, 1978, ten petitions seeking adjustment assistance for over 1,200 laid-off zinc miners and smelter workers were pending before the U.S. Department of Labor.

Substantial cause. Section 201(b)(4) of the Trade Act defines the term "substantial cause" to mean "a cause which is important and not less than any other cause." Section 201(b)(2) further provides that, in determining "substantial cause," the Commission "shall take into account all economic factors which it considers relevant, including (but not limited to) . . . an increase in imports (either actual or relative to domestic production) and a decline in the proportion of the domestic market supplied by domestic producers."

In the course of the investigation, a number of factors were suggested as constituting causes of injury. Among these suggested causes were increased imports; a decline in consumption; labor, power, equipment and supply problems in the industry; and environmental regulations. After consideration of these factors, we have determined that the decline in consumption of slab zinc is a more important cause of injury to the domestic industry than any increase in imports which occurred.

Consumption of slab zinc in the United States declined by 27 percent in the period 1973 to 1977. This overall decline in consumption can be traced to two factors--the depressed economic conditions starting in late 1974 and continuing through 1976, and the loss of market share to substitute products.

From 1973 to mid-1974, demand for zinc was very high, leading to shortages and high prices. As industrial activity began to decline, demand for zinc fell off sharply. In 1975, domestic slab zinc consumption was 38 percent lower than in 1973. The demand for galvanized steel, one of the major end uses of zinc, is dependent on construction activity which declined significantly during 1973-75. In the automobile industry, the largest consumer of zinc diecastings, production dropped 33 percent from 1973 to 1975. As a result of the combination of these factors, demand for slab zinc in 1975 was lower than in any other year in the period 1973 to 1977. As the economy began to recover in 1976, slab zinc production and consumption also increased somewhat. Although the economy improved in 1977, consumption declined about 3 percent.

The second factor in the decline in consumption involves the substitution of alternative materials for slab zinc. Although galvanized steel competes with steel products with ceramic and plastic coatings and with steel products electroplated with aluminum and cadmium, the primary impact of product substitution is felt in the diecasting market. Zinc base alloys are used to produce diecastings, the largest share of which go to the automotive industry. In the shortage period of 1973-74, the high price of zinc as well as supply problems caused the automakers to look to other materials for future model years. The consumption of slab zinc in zinc-base alloys was 41 percent of overall consumption in 1973 and 34 percent in 1977.

This move away from zinc was accelerated by the demands of energy conservation. The Environmental Protection Agency has required the automobile industry to increase its mileage ratings. In order to comply with these regulations, the weight of new vehicles has been cut by reducing their size and using lighter weight materials. Use of plastics, aluminum, and high strength steel has increased, while zinc use has declined. The weight of zinc diecastings used in the average car has declined 50 percent from 1976 to 1978.

These factors resulted in a decrease in slab zinc consumption of approximately 400 thousand tons in the years 1973 to 1977. In the same period, the tonnage of slab zinc consumption directly supplied by domestic producers declined by about 160 thousand tons.

In 1977, domestic producers accounted for 45 percent of domestic consumptiom, slightly below the 46 percent average of the years 1973-77 and the 3-year 1975-77 average. Thus, the proportion of the domestic market supplied by domestic producers has remained about the same. During this period, however, consumption declined by 27 percent, as mentioned.

On the basis of the factors set forth above, we have determined that increased imports are not a substantial cause of serious injury or the threat thereof to the domestic industry within the meaning of section 201 of the Trade Act of 1974.

Concurring Views of Chairman Joseph O. Parker

I concur in the determination of the Commission in this proceeding and generally in the views expressed by Commissioners Moore, Bedell and Ablondi. My concurring views are set forth below.

Imports over the past few years have been irregular. Imports decreased from 587,000 tons in 1973 to 375,000 tons in 1975, rose to 695,000 tons in 1976, but declined to 555,000 tons in 1977, a level less than that in 1973. The level of imports in 1977 was significantly above that in only 1 of the previous 4 years, 1975, a recession year in which both imports and domestic production declined sharply.

Domestic production accounted for a relatively constant share of domestic consumption in the period 1973 through 1977, ranging from 44 to 49 percent. In 1977, domestic producers' shipments accounted for 45 percent of domestic consumption. In 1973 and 1974, in a period of high demand and tight slab zinc supplies, about 20 percent of domestic consumption requirements were supplied by releases from GSA stockpiles. When these releases declined to less than 1 percent of consumption in 1975 and then ceased entirely in 1976 and 1977, the share of domestic consumption previously supplied by the stockpile releases was filled by imported slab zinc. Throughout the 5-year period, however, domestic producers continued to supply about the same share of domestic consumption requirements whether the market was expanding or declining, as mentioned. It is the decline in consumption and not imports which is the principal factor causing the present distress of the slab zinc industry.

In 1977, consumption of slab zinc was 27 percent below that of 1973.

The decline in demand for galvanized steel by the construction industry, one of the principal users of zinc, resulted in a decline in demand for zinc. From 1973 to 1975, production declined by approximately one-third in the automobile industry, which is the largest consumer of zinc diecastings. With the recovery of the economy in 1976, domestic consumption and both imports and domestic production increased. In 1977, however, consumption again declined, as did imports and domestic production. This continued decline in consumption is, in part, related to the substitution of other products for zinc.

The need for lighter weight materials, particularly in the automobile industry, has resulted in some shift from zinc to other products such as aluminum and plastics. The quantity, by weight, of zinc diecastings used in automobiles declined about 50 percent from 1976 to 1978.

Consumption of slab zinc continued to decline during the first quarter of 1978. For a period of years, domestic production, domestic shipments, and imports have declined as consumption declined. Domestic shipments and imports were both about 30 percent lower in the first quarter of 1978 than in the first quarter of 1977, as consumption further declined.

I have, therefore, determined that increased imports are not a substantial cause of serious injury or the threat thereof to the domestic industry.

REASONS FOR NEGATIVE DETERMINATION OF COMMISSIONER BILL ALBERGER

On the basis of the evidence developed by the Commission in this investigation, I determine that unalloyed unwrought zinc of the type described in the notice is not being imported into the United States in such increased quantitites as to be a substantial cause of serious injury, or the threat thereof, to the domestic industry producing the like or directly competitive products.

The Trade Act of 1974 (Section 201(b)(1)) requires that each of the following conditions be met before an affirmative determination can be made:

> (1) There are increased imports (either actual or relative to domestic production) of an article into the United States;
>
> (2) A domestic industry producing an article like or directly competitive with the imported article is seriously injured, or threatened with serious injury; and
>
> (3) Such increased imports of an article are a substantial cause of serious injury, or the threat thereof, to the domestic industry producing an article like or directly competitive with the imported article.

Specifically, I find that the third criterion under Section 201(b)(1), as set forth above, has not been met -- the increased imports are not a substantial cause of any injury being experienced by the domestic industry.

The Domestic Industry

In this investigation I have concluded that the relevant domestic industry consists of the facilities in the United States used in the production of unalloyed unwrought zinc (slab zinc).

Increased Imports

Imports of slab zinc were 587,000 short tons in 1973, 544,000 short tons in 1974, 375,000 short tons in 1975, 695,000 short tons in 1976, and 555,000 short tons in 1977. A five year trend line, using the least squares method, shows a slight increase over the five-year period.

The ratio of imports to domestic production over the same period was 88% in 1973, 86% in 1974, 76% in 1975, 123% in 1976, and 111% in 1977. This shows a more significant increase over the five-year period, with a drop in 1977.

I conclude that imports are increasing within the meaning of the statute.[1/] The increase is not a major one, but it is an increase.

Serious Injury

The Trade Act does not define the term "serious injury" but does provide guidelines in the form of economic factors. Under section 201(b)(2) the Commission is to take into account "all economic factors which it considers relevant, including (but not limited to) -- "A. . . , the significant idling of productive facilities in the industry, the inability of a significant number of firms to operate at a reasonable level of profit, and significant unemployment or underemployment within the industry. . ."

I have also considered and analyzed other economic developments in the industry to determine whether serious injury exists. These include (1) production and shipments, (2) price levels, and (3) inventory levels.

1/ It should be noted that domestic producers contributed to the level of imports. In fact, if the imports by domestic producers are subtracted from total imports (which is arguably a legitimate approach since petitioners ought not be able to argue imports are increasing only because they imported enough themselves to create that situation), the trend line of the remaining imports is downward.

Idle facilities -- Over the past 11 years, domestic production capacity has declined from 1,297,000 short tons to 709,000 short tons. Eight plants closed during this period, and the public statements of company officials indicated the reasons were the age of the facilities, costs of complying with pollution control regulations, and an inability to secure adequate supplies of raw materials. During this period, capacity utilization ranged from 78% to 87% until 1975 when the level was only 69%. 1976 was a year of recovery, and capacity utilization reached 79%, but fell again to 71% in 1977.

Profits -- This is a dismal picture as profits fell from $20.3 million in 1973 to a loss of $11.4 million in 1977. The ratio of net operating profits to net sales shows the same trend -- 7.7% in 1973, 2.9% in 1976, and a negative ratio (4%) in 1977. There is no doubt that this industry is experiencing serious financial problems.

Employment -- During the period 1973-1977 the number of all employees in the primary slab zinc industry dropped by nearly 15%. In the same period, the number of production and related workers dropped by 23%. Part of this drop in employment and the number of manhours worked is directly attributable to a 4-1/2 month strike at Bunker Hill in 1977, a conversion of one plant, and one plant closing due to obsolescence of facilities.

Production and shipments -- Production by domestic producers declined from 666,000 short tons in 1973 to 496,000 short tons in 1975, recovered to 563,000 short tons in 1976, and fell again to 502,000 short tons in 1977. Shipments by U.S. producers declined similarly from 663,000 short tons in

1973 to 445,000 short tons in 1975, recovered to 532,000 short tons in 1976 and declined again to 501,000 short tons in 1977.

Inventories -- Inventories of U.S. producers rose steadily from 34,000 short tons in 1973 to 117,000 short tons in 1976 and to 118,000 short tons in 1977. Inventories held by consumers increased from 114,000 short tons to 211,000 short tons in 1974, dropped to 107,000 short tons in 1975, increased to 121,000 short tons in 1976 and dropped again to 87,000 short tons in 1977.

Prices -- While prices were fairly strong in 1973-74, peaking in the last quarter of 1974, prices have fallen since then, to quite low levels in 1977. Import prices were basically above domestic prices until the last quarter of 1975. The margin by which import prices were below domestic prices in 1976-77 reached about 4 percent by the end of the second year.

Considering all of these economic factors, I conclude that the domestic industry is being seriously injured.

Substantial Cause

Section 201(b)(4) of the Trade Act defines the term "substantial cause" to mean "a cause which is important and not less than any other cause." Thus, increased imports must be both an "important" cause of injury or the threat thereof and "not less than any other cause." Section 201(b)(2) further provides that in determining "substantial cause" the Commission "shall take into account all economic factors which it considers relevant, including (but not limited to) . . . an increase in imports (either actual or relative to

domestic production) and a decline in the proportion of the domestic market supplied by domestic producers."

In my judgment, in this highly cyclical market for slab zinc, falling demand for the product was the most important cause of injury to the domestic industry.

The decline in slab zinc consumption in the United States occurred in two stages during the 5 year period I have analyzed. In late 1974, the overall economy began a serious slump, affecting demand for slab zinc through 1976. While recovery from the recession was anticipated in 1976, it did not occur for zinc in the volumes expected, and consumption declined a further 13 percent in 1977. The declines in 1976 and 1977 are attributable primarily to a loss of market to substitute products. The demand for galvanized steel products, a major end-user of slab zinc, is dependent on demand for structural steel, roofing, siding and duct material for air conditioning. All of those markets were declining from 1973 to 1975. Some substitution of ceramic and plastic coated steel and the use of aluminum and cadmium for electroplating hurt the demand for zinc in galvanizing. The more serious substitution problems occurred in the diecasting market.

The automobile industry, the principal market for diecasting has reduced its use of diecast zinc by almost one-half since 1975. Plastics, aluminum, and high strength steel have been substituted for diecast zinc as the auto industry has cut the weight and reduced the size of its vehicles in an effort to meet the more stringent mandated mileage rating requirements.

Overall slab zinc consumption has declined 27 percent from 1973 to 1977. Use of slab zinc in galvanizing declined 27 percent, in zinc based alloys declined 38 percent, and in brass and bronze declined 30 percent.

I believe other factors also played a role in the injury being experienced by the domestic industry. Among these factors are the impact of environmental regulations, labor problems and imports.

From 1968 through 1976, eight zinc smelters or refineries closed in the United States. Statements by company officials during this investigation attributed these closings to obsolescence, lack of ores and concentrates and the costs of meeting environmental regulations.

The environmental costs impacted most heavily on the plants using the horizontal retort process rather than those using the more efficient electrolytic process.

In 1977, a 4-1/2 month strike at the Bunker Hill facility in Idaho, along with power curtailments, machinery breakdowns and supply problems in the raw materials sector cost the industry, by their own aggregated estimates, a loss in domestic production of 55,000 short tons.

As indicated previously, imports have shown a slightly upward trend over the past five years. Imports dropped from 1973 to a recessionary low in 1975, experienced a sharp recovery in 1976 and went downward by 20 percent in 1977. For the most part, imports to the United States have closely followed world market conditions over the past five years.

Conclusion

I have found that the statutory test for increased imports is met, although the increase is not that significant. I have also found that the domestic industry is suffering "serious injury" within the meaning of the

statute. However, I am not able to find evidence that such increased imports are a substantial cause of this serious injury. In this case, it is clear to me that the increased imports did not cause this injury. I believe the only substantial cause in this case is the significant downturn in demand occurring over the last five years.

Views of Commissioner Daniel Minchew

On December 20, 1977, the United States International Trade Commission received a petition requesting an investigation under section 201(b)(1) of the Trade Act of 1974 with respect to imports of unalloyed, unwrought zinc. On December 29, 1977, the Commission instituted an investigation to determine whether unwrought zinc, other than alloys of zinc, provided for in item 626.02 of the Tariff Schedules of the United States, is being imported into the United States in such increased quantities as to be a substantial cause of serious injury, or the threat thereof, to the domestic industry producing an article like or directly competitive with the imported article.

Section 201(b)(1) of the Trade Act requires that each of the following criteria be met if the Commission is to make an affirmative determination in this investigation and thus find a domestic industry eligible for import relief:

(1) Imports of the article concerned are entering the United States in increased quantities (either actual or relative to domestic production);

(2) The domestic industry producing an article like or directly competitive with the imported article is being seriously injured or threatened with serious injury; and

(3) Increased imports are a substantial cause of the serious injury, or the threat thereof, to the domestic industry producing an article like or directly competitive with the imported article concerned.

Determination

On the basis of the evidence obtained during this investigation, I have determined that unwrought zinc, other than alloys of zinc, provided for in item 626.02 of the TSUS, is being imported into the United States in such increased quantities as to be a substantial cause of serious injury to the domestic industry producing an article like or directly competitive with the imported article.

The domestic industry

In this investigation I have concluded that the relevant domestic industry consists of the U.S. facilities used in the mining of zinc and the production of unalloyed, unwrought zinc. 1/ In 1977, there were six domestic producers of primary zinc, eleven producers of secondary zinc, and 35 firms engaged in zinc mining operations. 2/3/

Increased imports

Imports of slab zinc increased from 375,000 short tons in 1975 to 695,000 short tons in 1976; as a percentage of U.S. production, imports rose from 76 percent to 123 percent in the same time period. Imports in 1977 totaled 555,000 short tons, the equivalent of 111 percent of U.S. production in that period. Imports increased from an average level of 566,000 short tons in 1973-74 to an average level of 625,000 short tons in 1976-77. Thus the statutory requirement of increased imports is clearly satisfied.

1/ Unalloyed unwrought zinc will hereinafter be referred to as slab zinc.

2/ A "primary" producer produces primarily from ore or concentrates. A "secondary" producer produces from scrap.

3/ The performance of primary and secondary producers is representative of the overall industry. Therefore, mining operations will not be further discussed.

Serious injury

Although the Trade Act provides no precise definition of the term "serious injury," section 201(b)(2)(A) of the Trade Act provides that the Commission should take into account all relevant factors, including (but not limited to)--

> the significant idling of the productive facilities in the industry, the inability of a significant number of firms to operate at a reasonable level of profit, and significant unemployment or underemployment within the industry.

Significant idling of productive facilities. -- U.S. producers' productive capacity declined from 781,000 short tons in 1973 to 709,000 short tons in 1977. In addition, only slightly more than 70 percent of this capacity was utilized in 1977 in comparison with a 85 percent utilization rate in 1973.

The principal reason for the decline in capacity utilization discussed above was the sharp drop in U.S. production of slab zinc from 666,000 short tons in 1973 to 502,000 short tons in 1977. U.S. production in 1977 was smaller than it had been in any year since 1967, except 1975, a recession year.

Inability of a significant number of firms to operate at a reasonable level of profit. -- The aggregate net operating profits for the six U.S. producers of primary slab zinc and two secondary producers on their operations on slab zinc fell from $20.2 million in 1973 to an operating loss of $11.4 million in 1977.

The ratio of net operating profits to net sales fell from 7.7 percent in 1973 to 2.9 percent in 1976. Losses in 1977 were four percent of net sales. The six primary producers operated profitably in 1976 and 1975. This performance is evidence of the inability of a significant number of firms in the industry to operate at a reasonable level of profit.

Significant unemployment or underemployment within the industry. -- The 3,141 production and related workers engaged in the manufacturer of slab zinc represent a drop of 23 percent from 1973 and a drop of 19 percent from 1974, when there were 4,103 and 3,882 production and related workers, respectively. In addition, manhours worked by production and related workers fell from 8.7 million hours in 1973 to 6.2 million hours in 1977. The decline in the number of persons employed and the number of manhours worked has resulted in significant unemployment and underemployment within the industry.

Substantial cause

The third criterion which must be met before an industry is eligible for import relief is that the increased imports must be a "substantial cause" of the serious injury, or threat thereof, being suffered by the domestic industry. The Trade Act contains both a definition of the term "substantial cause" and certain guidelines to be considered by the Commission in determining whether increased imports are a substantial cause of the requisite serious injury. Section 201(b)(4) of the Trade Act defines the term "substantial cause" to mean "a cause which is important and not less than any other cause." The guidelines to be considered by the Commission with regard to substantial cause are contained in section 201(b)(2)(C), which states that in making its determination the Commission shall take into account all economic factors which it considers relevant, including (but not limited to)--

> An increase in imports (either actual or relative to domestic production) and a decline in the proportion of the domestic market supplied by domestic producers.

In my opinion, the information before the Commission clearly shows increased imports to be substantial cause of serious injury to the domestic industry. As previously stated, annual U.S. imports of slab zinc increased 85 percent between 1975 and 1976 and the share of the U.S. market for slab zinc supplied by imports rose from 39 percent in 1973 to 50 percent in 1977. Of particular concern to me is the build up in inventories of slab zinc. It is noted that total inventories (the sum of inventories held by producers, consumers and importers) rose from 175,000 short tons in 1973 to 346,000 short tons in 1976. Inventories held by importers rose from 21,000 short tons at the end of 1974 to 108,000 short tons at the end of 1976, or approximately 31 percent of total inventories were held by importers at the end of 1976. In relation to consumption, inventories of slab zinc increased from 12 percent in 1973 to 31 percent in 1976. I believe that the large amount of unsold inventory at the end of 1976, which was in large part due to the build up of importers' inventories, resulted in a strong decline in average U.S. prices for slab zinc in 1977 from 36 cents a pound during the first quarter to 31 cents per pound during the last quarter of 1977. It is my view that those growing unsold inventories caused by increased imports resulted in the serious injury suffered by the domestic slab zinc industry.

Conclusion

In view of the above, I have determined that the domestic industry producing slab zinc is being seriously injured within the meaning of section 201 of the Trade Act of 1974, and, therefore, I have made an affirmative determination.

INFORMATION OBTAINED IN THE INVESTIGATION

Introduction

The United States International Trade Commission instituted the present investigation with respect to imports of unalloyed, unwrought zinc on December 29, 1977, following receipt on December 20, 1977, of a petition for import relief under section 201 of the Trade Act of 1974 (19 U.S.C. 2251) filed by the Lead-Zinc Producers Committee.

The Commission instituted the investigation to determine whether unwrought zinc, other than alloys of zinc, provided for in item 626.02 of the Tariff Schedules of the United States (TSUS) is being imported into the United States in such increased quantities as to be a substantial cause of serious injury, or the threat thereof, to the domestic industry producing an article like or directly competitive with the imported article.

Notice of the institution of the investigation and of the public hearing to be held in connection therewith was given by posting copies of the notice in the Office of the Secretary, U.S. International Trade Commission, Washington, D.C., and the Commission's office in New York City, and by publishing the notice in the Federal Register of January 5, 1978 (43 FR 31015). 1/ The hearing was held in Washington, D.C., on March 21-24, 1978. The information in this report was obtained from fieldwork; questionnaires sent to domestic producers, importers, and consumers; the Commission's files; information obtained in the course of the public hearing; briefs submitted by interested parties; and other Government agencies.

Description and Uses

Unalloyed, unwrought zinc (TSUS Item 626.02) refers to zinc metal, usually refined, in the form of slabs and blocks (jumbos) as well as ingots, anodes, lumps, pigs, billets, cakes, briquets, cathodes, cubes, pellets, shot, grains, sticks, sponge and similar primary forms. It does not cover zinc that is rolled, drawn, forged or extruded; cast and sintered forms of zinc which have been machined or processed; and tubular zinc products. The most common commercial forms of unwrought zinc are slabs and blocks, which are large rectangular forms which weigh about 55 pounds and 500 to 2,400 pounds, respectively. Zinc in all its unwrought forms that fall under TSUS item 626.02 will be referred to as slab zinc in this report.

1/ A copy of the Commission's notice concerning the investigation and hearing is presented in app. A.

The most important raw material source for slab zinc is zinc ore/and or concentrates. Most zinc ore is of the sulfide type whose principal mineral is sphalerite (zinc sulfide). Zinc ore sometimes can occur geologically as a zinc oxide, zinc carbonate, zinc silicate, or zinc vanadate. Zinc ores usually contain a number of other metals, such as lead, copper, silver, cadmium, and germanium. Zinc ore usually has a metal content low enough to require concentration not far from the mine; the concentrate can contain from 40 to 65 percent zinc. Secondary zinc-bearing materials include zinc dross and skimmings, which are zinc- or zinc-oxide-containing products formed during the galvanizing process, and zinc fume, which is material that becomes gaseous at high furnace temperatures and then collects as a solid in the flues. Zinc ores and concentrates are converted into slab zinc by a number of different methods, such as the electrolytic and vertical retort; secondary zinc-bearing materials are converted into slab zinc by several rather similar methods.

Methods of production

Most zinc ore is obtained from underground mines, usually by a room-and-pillar method. This method, which is used on a flat or gently dipping ore body, involves excavating chambers and leaving pillars of ore or waste rock to support the roof. The ore is next crushed and milled, often to the fineness of flour. Then the ore minerals are separated from the waste rock and from each other--usually by flotation, which involves floating the ore minerals off on the surface of bubbles coated with special chemicals. After flotation, the concentrate is prepared for transportation or processing. Before zinc metal is recovered from zinc ore or concentrate by either the electrolytic or vertical retort method, the zinc ore or concentrate is first roasted to remove sulfur and convert the ore into an oxide form with minor associated zinc sulfate.

Most zinc producers, both foreign and domestic, use the electrolytic method of production. The roasted zinc concentrate is first leached with sulfuric acid, which dissolves the zinc and other metals such as copper, cadmium, and iron. The resulting solution is then purified by adding zinc dust, which dissolves and forces the other less active metals mentioned above out of the solution. The purified solution is piped to electrolytic cells, where zinc metal is electrodeposited on aluminum cathodes. When the cathodes reach a certain size they are removed from the cell and stripped of the zinc. The zinc is then melted in a furnace and cast in the form of a slab or block.

The vertical retort plants can use either continuous vertical retorts (furnaces), fired by a fuel, or continuous vertical retorts heated electrothermally. Both types use coal or coke to reduce the oxidized zinc concentrate to metal. The metal vaporizes and passes into condensers where the zinc can be collected after cooling as a liquid metal suitable for casting into a slab or block. The zinc produced by this method is less pure than zinc produced electrolytically.

Secondary zinc-bearing materials are handled by somewhat similar methods. Dross, skimmings, and impure scrap are heated in a furnace until vaporization occurs, after which the vapor is passed into condensers to obtain liquid metal which is then cast. If the zinc scrap is clean and pure, it may simply be remelted and then cast.

The relative efficiencies of the electrolytic, vertical retort, and electrothermic processes can be ranked in terms of unit cost of production, recovery factor, unit energy consumption, and unit man-hours worked (summarized in the following table). The average unit costs of slab zinc production for 1976 and 1977 were 31.9 cents per pound for the electrolytic process, * * * cents per pound for the vertical retort process, and * * * cents per pound for the electrothermic process. The recovery factors (proportion of zinc in ore recovered as zinc product), according to data from the Bureau of Mines, are 95 percent for the electrolytic process, 87 percent for the vertical retort process, and 87 percent for the electrothermic process. The energy consumption figures per ton of zinc, as determined by Battelle Columbus Laboratories, are 60.17 X 10^6 Btu for the electrolytic process, 65.06 X 10^6 for the vertical retort process and 72.57 X 10^6 for the electrothermic process. The unit man-hours workload per ton of zinc produced are 12.8 man-hours per ton for the electrolytic process, * * * man-hours per ton for the vertical retort process, and * * * man-hours for the electrothermic process, averaged for 1976 and 1977.

Slab zinc: Man-hours worked per ton of zinc produced and cost of production, by types of production process, 1976 and 1977

Period and type	Man-hours worked	Cost of production
	Per ton	Cents per pound
1976:		
Electrothermic	***	***
Vertical retort	***	***
Electrolytic 1/	12.3	30.6
1977:		
Electrothermic	***	***
Vertical retort	***	***
Electrolytic 1/	13.2	32.2

1/ 3 firms.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Marketing and use

Slab zinc comes in a number of different grades, which are inscribed by being cast onto the surface of the slab or block along with the producer's name and registered brand. The grade of slab zinc with the highest purity is Special High Grade (SHG), which contains a minimum of 99.99 percent zinc and a maximum of 0.003 percent lead, 0.003 percent iron, and 0.003 percent cadmium. The next three grades, High Grade, Intermediate, and Brass Special, are all produced and consumed in relatively small amounts and contain a minimum of 99.9 percent, 99.5 percent, and 99.0 percent zinc, respectively. The grade of zinc with the lowest purity is Prime Western (PW), which contains a minimum of 98.0 percent zinc and a maximum of 1.6 percent lead, 0.05 percent iron, and 0.50 percent cadmium. Continuous Galvanizing Grade (CGG) is statistically included with PW and while both are used in galvanizing, they differ in that CGG has a lead content of only 0.3 to 0.4 percent.

At present, the most important uses of slab zinc are in galvanizing and in zinc-diecasting alloys. Galvanized sheet and strip and other galvanized steel products account for 37 percent of slab zinc consumption. Galvanized steel, which has increased rust and corrosion resistance, is widely used in construction, automobiles, and appliances. Zinc-diecasting alloys are produced by melting SHG slab zinc and adding alloying elements, principally copper and aluminum. A very widely used zinc-diecasting alloy contains from 3.5 to 4.3 percent aluminum, up to 1.25 percent copper, and 0.03 to 0.08 percent magnesium; and the balance is zinc. Zinc diecastings are used extensively as automobile parts and hardware, although they have been losing some of these markets to other materials such as aluminum and plastics. Use of zinc in die-cast alloys accounts for about 34 percent of slab zinc consumption.

Other important uses include use as an alloying element in the manufacture of brass and bronze (13 percent of consumption) and as a zinc oxide pigment (4 percent of consumption). 1/ Zinc is also used in rolled zinc products such as sheet, strip, and wire.

Zinc competes with a variety of other materials. It has been in a losing competition with aluminum and plastics for the diecasting market, although the development of thin-walled diecasting is helping zinc to regain some of its market share. It has been gaining on other materials in the automotive market as the use of galvanized, thinner gauge steel increases. The weight of galvanized steel used in automobiles increased 50 percent from 1973 to 1976, on track with a forecasted 100 percent increase from 1973 to 1980, or from 100 pounds in 1973 to 200 pounds in 1980. However, galvanizing has competition from steel products with ceramic and plastic coatings and from steel products electroplated with cadmium and aluminum. Galvanized sheet has competition from aluminum sheet. Brass has been losing out in the hardware markets to aluminum alloys, stainless steel, and plastics.

1/ Significant amounts of zinc concentrates are used in the production of zinc oxide. If inputs of both slab zinc and concentrates were considered, zinc oxide would account for 12 percent of zinc consumption.

U.S. Government stockpile program

Slab zinc is considered to be a strategic and critical material and thus is stockpiled by the General Services Administration (GSA) in order to have adequate supplies if imports are cut off in an emergency. Stockpile goals (the quantity of material to be stockpiled) are set by the President after the responsible agencies have provided him with information on the duration of any possible national emergencies, consumption of strategic materials during the national emergency, and supplies available fron nonstockpile sources. After the goals have been set, Congress must authorize the purchases or sales that are necessary to meet the goals. The GSA was a net seller of zinc under the former stockpile goal of 203,000 tons; however, it would be a significant purchaser of slab zinc under the present goal of 1.3 million tons, if such purchases received congressional approval. Congress is currently considering a number of stockpile-related bills, including one which would authorize the sale of certain strategic materials (zinc is not included). An Administration budget request for purchases of strategic metals (the type of materials in the request is confidential) is also under consideration. Large GSA purchases were suggested as a possible remedy to injury by opponents to the petitioners' tariff-rate-quota remedy. Stockpile holdings of slab zinc were 374,000 tons as of December 31, 1977.

U.S. Tariff Treatment

Unalloyed, unwrought zinc (slab zinc) was originally dutiable under paragraph 394 of the Tariff Act of 1930 at 1.75 cents per pound. After the series of trade concessions and duty changes shown in the following table, the current rate of 0.7 cents per pound came into effect as of June 6, 1951. Slab zinc is not one of the eligible articles entitled to duty-free treatment when imported from beneficiary developing countries under the Generalized System of Preferences (GSP).

Slab zinc: U.S. rates of duty applicable under TSUS item 626.02, June 18, 1930-Dec. 31, 1977

Effective date	Rate of duty	Authority
	Cents per pound	
June 18, 1930	1.75	Tariff Act of 1930
Jan. 1, 1939	1.4	Trade agreement, Canada
Jan. 30, 1943	.875	Trade agreement, Mexico
Jan. 1, 1948	.875	GATT 1/
June 6, 1951	.7	Do.
Aug. 31, 1963	.7	Tariff Classification Act of 1962.

1/ General Agreement on Tariffs and Trade.

In addition to the duty reductions mentioned above, the amount of protection also has dropped because the price for slab zinc is now seven times what it was in 1930. This loss of protection is shown by the ad valorem equivalents, which dropped from 38.7 percent in 1930 to 4.9 percent in 1970 and then to 2.2 percent in 1977. Thus the ad valorem equivalent in 1977 was less than 6 percent of its level in 1930.

Quarterly quotas were imposed on slab zinc imports by Presidential Proclamation 3257, effective October 1, 1958, following escape-clause investigation No. 65, conducted by this Commission (then known as the U.S. Tariff Commission), under the provisions of section 7 of the Trade Agreements Extension Act of 1951. The quota restricted slab zinc imports, including waste and scrap, to an annual total of 141,120 tons. The quotas also covered several other zinc and lead items, and were based on 80 percent of the average annual amount of these materials imported during 1953-57. The principal suppliers of these imports were assigned individual quantity quotas for each calendar quarter commensurate with deliveries from that nation during the base period. The quotas were terminated by Presidential Proclamation 3863, effective November 21, 1965, after the Commission reported to the President on investigation No. TEA-1A-3 under section 351(d)(2) of the Trade Expansion Act of 1962.

The Commission also conducted two investigations to determine eligibility to apply for adjustment assistance under section 301(c)(2) of the Trade Expansion Act of 1962, in response to petitions from the former workers at the Hanover, N. Mex. mine of New Jersey Zinc and the Dumas, Tex., slab zinc plant of the American Zinc Co. It made unanimous, negative determinations in both instances (investigation Nos. TEA-W-1 (New Jersey Zinc) and TEA-W-111 (American Zinc)).

On June 18, 1976, the Lead-Zinc Producers Association filed a petition with the Department of the Treasury alleging that the Spanish Government was providing a bounty or grant, within the meaning of the countervailing duty law (section 303 of the Tariff Act of 1930, as amended (19 U.S.C. 13031)), on Spanish slab zinc exports to the United States in the form of rebates of 12 percent of the local value of zinc. After an investigation, the Department of Treasury made an affirmative determination and imposed countervailing duties equal to the amount of the Spanish subsidy on slab zinc. These imports were assessed an additional countervailing duty of 4 percent ad valorem, effective April 8, 1977.

The item under investigation is closely related to a number of other zinc items, whose tariff history is shown in the table on the following page. The only Kennedy round duty reductions occurred in zinc dust. The duties on zinc ore, zinc-bearing raw materials, and zinc waste and scrap have been suspended for a 3-year period beginning June 30, 1975. A bill (H.R. 9911) to suspend the duties for an additional 3 years was introduced in Congress in November 1977.

Slab zinc: U.S. col. 1 rates of duty and average ad valorem equivalents of the rates, by types of product, Dec. 31, 1967 and Dec. 31, 1977

Commodity descriptions and TSUS item	Col. 1 rates applicable on--		Approximate ad valorem equivalent of 1977 duty
	Dec 31, 1967	Dec. 31, 1977	
Zinc oxide (pigment):			
473.76 1/	0.6¢ per lb.	0.6¢ per lb.	1.6
473.78 1/	1¢ per lb.	1¢ per lb.	2.1
Zinc ore and other zinc-bearing materials:			
602.20 1/	0.67¢ per lb. on zinc content	0.67¢ per lb. on zinc content 2/	4.3
603.30 1/	0.75¢ per lb.	0.75¢ per lb. 2/	5.6
603.49 1/	0.67¢ per lb. on zinc content	0.67¢ per lb. on zinc content 2/	3/
603.50 1/	0.67¢ per lb. on zinc content	0.67¢ per lb. on zinc content 2/	3.1
603.54 1/	0.67¢ per lb. on zinc content	0.67¢ per lb. on zinc content 2/	3/
603.55 1/	0.67¢ per lb. on zinc content	0.67¢ per lb. on zinc content 2/	3/
Zinc alloys (unwrought):			
626.04	19% ad val.	19% ad val.	-
Zinc waste and scrap:			
626.10	0.75¢ per lb.	0.75¢ per lb. 2/	7.0
Zinc dust:			
626.40 1/	0.7¢ per lb.	0.3¢ per lb.	0.7
626.42 1/	19% ad val.	9.5% ad val.	-

1/ Imports are eligible for duty-free treatment under the GSP.
2/ Duty temporarily suspended.
3/ No imports in 1977.

U.S. Producers

Unalloyed, unwrought zinc is of two general classifications; primary and secondary. Primary zinc is produced from newly mined ores or concentrates while secondary zinc is produced from scrap or residues. A number of large primary producers have the capability to produce secondary zinc, but none of the secondary zinc producers have the capability to produce primary zinc.

Primary zinc producers

Production of primary zinc metal is currently undertaken by six domestic firms. The names of these companies and their smelter and/or refinery locations are as follows:

Name of Company	Location of smelter or refinery
AMAX, Inc	Sauget, Ill.
ASARCO, Inc	Corpus Christi, Tex.
The Bunker Hill Co.: subsidiary of Gulf Resources & Chemical Corp	Kellogg, Idaho
New Jersey Zinc Co.: subsidiary of Gulf & Western Natural Resources Group	Palmerton, Pa.
St. Joe Minerals Corp	Monaca, Pa.
National Zinc Co.: subsidiary of Engelhard Minerals & Chemicals Corp	Bartlesville, Okla.

Production in the AMAX, ASARCO, Bunker Hill, and National Zinc refineries operates by the electrolytic process. New Jersey Zinc has a vertical retort process while St. Joe uses an electrothermic process. 1/ The newest domestic facility is the National Zinc Co. New Jersey Zinc is currently constructing an electrolytic refinery in Tennessee, scheduled to begin operation in 1979.

Secondary zinc producers

There are currently 11 domestic firms known to be involved in the production of secondary zinc. Smelters are located in nine States with

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1/ Facilities using vertical retorts or electrothermic furnaces are referred to as smelters. Those using the electrolytic process are referred to as refineries.

the largest producers located in Alabama, California, and Texas. In all cases, the production of zinc is a relatively minor part of these metal extraction businesses.

Zinc-bearing ores and concentrates

Zinc ore is mined in 19 States, the major producing States being Tennessee, New York, Missouri, Colorado, and Idaho. In 1977, 13 companies, operating 25 mines, accounted for 89 percent of the recoverable domestic zinc mined in that year. The five leading mines, all owned by primary zinc producers, accounted for 41 percent of the total U.S. mine production. In 1977, 35 companies were involved in the mining and milling of zinc ore.

Concentration and foreign affiliations

The five petitioning domestic primary producers account for over 90 percent of slab zinc production. These same five firms account for over 40 percent of domestic mine output.

All of the producers of primary zinc have affiliations with either foreign mining operations or foreign refining operations. 1/ The six primary producers, their domestic parent company or affiliates, and their foreign affiliates are as follows:

Producer	Domestic parent or affiliate	Foreign affiliate
AMAX, Inc----------	1. AMAX Zinc Co. 2. Ametalco, Inc.	1. AMAX Exploration (Australia) 2. Botswana RST Ltd. (Botswana) 29.8 percent 3. Canada Tungston Mining Corp. 46 percent 4. Imetal SA (France) 11 percent 5. O'okiep Copper Co. Ltd. (S. Africa) 17.3 percent 6. Roan Consolidated Mines Ltd. (Zambia) 20.4 percent 7. Tsumeb Corp. Ltd.: Newmont Mining (Managing Agent) (S.W. Africa) 29.6 percent 8. Heath Steele Mines (Canada) 100 percent 9. Newfoundland Zinc Mines (Canada) 27 percent.

1/ National Zinc is a subsidiary of Engelhard Minerals and Chemicals Co., a large metal trading company with foreign interests.

ASARCO----------	1. Blackhawk Mining & Developing Co. Ltd.	1. ASARCO (Australia) Pty Ltd. South Pacific Div.
	2. Federated Metals Corp.	2. Industrial Minera Mexico 34 percent
	3. Revere Copper & Brass, Inc.	
	4. The International Metal Co.	3. Southern Peru Copper Corp.
	5. Wyoming Mining & Milling.	4. Neptune Mining (Nicaragua)
		5. ASARCO Exploration (England)
		6. M.I.M. Holdings Limited (Australia) 44 percent
		7. Northern Peru Mining
		8. Cia. Minera Quioma (Bolivia) 58 percent.
Bunker Hill Co----	1. Gulf Resources & Chemical Corp. (parent).	1. Gulf Minerals Canada Ltd.
National Zinc-----	1. Engelhard Minerals & Chemicals (Parent)	
	2. Philipp Bros.	
New Jersey Zinc---	1. Gulf & Western Nat. Res. Group (parent).	1. Asturienne New Jersey A.S. (France) 50 percent
		2. Camino Gold Mines Ltd. (Bolivia)
		3. Caballo Blanco Limitado (Bolivia)
		4. Thai Zinc Limited (Thailand)
		5. Hedman Mines Ltd. (Canada)
		6. N. J. Zinc Exploration (Canada)
		7. Quebec Iron & Titanuim Corp.
St. Joe Zinc------	1. St. Joe Minerals (parent).	1. Compania Miners Aguilar (Argentina)
		2. Compania Minerales Santander Inc. (Peru)
		3. Jododex Australia Pty Ltd.
		4. Canadaka Mines Ltd.
		5. Canadian Smelting & Refining
		6. St. Joe Exploration Ltd. (Canada)
		7. Mineracao San Jose Ltd. (Brazil)

Channels of Distribution

Domestically produced slab zinc is marketed directly by the producer, through sales agents or through firms called merchants or traders. These particular firms purchase zinc from both foreign and domestic sources and then sell it to consumers or other merchants as market conditions warrant. Prices are quoted on a delivered basis with shipments made by water, rail, or truck depending on available facilities. Domestic producers tend to market their output in their own geographical area of the country, tailoring their output grades to their customers within that area. However, all domestic producers will sell their output anywhere in the United States, upon demand.

Imported slab zinc is marketed through brokers, sales agents, domestic affiliates of foreign producers, or merchants. Imports are not confined to any region of the United States and are marketed on a nationwide basis.

Industry sources have indicated that in certain circumstances domestic and imported zinc shipments will be "swapped" in order to save shipping costs, e.g., a merchant with zinc on the west coast and a customer on the east coast will approach St. Joe Zinc Co. or New Jersey Zinc Co, and have them ship their zinc to the east coast customer. In return, the merchant will supply the needs of one of their west coast customers from his stocks. This is apparently not a normal distribution method, since it is used only when each party can be mutually satisfied.

Importers

Slab zinc was imported in 1977 by approximately 80 firms. Almost half of these were end users of slab zinc, such as U.S. Steel and Eastern Alloys, Inc. Most of these importations were accomplished through import brokers. About 10 metal traders or merchants imported in 1977. Three domestic primary slab producers, AMAX, Inc., ASARCO, and New Jersey Zinc, also imported zinc in 1977. Importers are concentrated in New York and in the steel and auto producing areas of the Midwest.

The Foreign Industry

Slab zinc was produced in about 31 countries in 1977, with the U.S.S.R., Japan, Canada, United States, West Germany, and Australia being the 6 largest producing nations. The petitioners allege that the threat of imminent serious injury exists because of increased foreign slab zinc production capacity. Data on world production and capacity are shown in tables 1-3, appendix B. Table 1 in that group indicates that world capacity outside the United States rose steadily after 1973 increasing 4 percent between 1976 and 1977.

This section presents a brief description of the productive capacity and actual production in 1977 1/ of the five largest foreign slab zinc producing countries.

U.S.S.R.

Statistics on slab zinc capacity are not available and production figures are a matter of conjecture. However, the U.S.S.R is thought to the world's largest producer of slab zinc, with estimated production in 1976 of 1.1 million short tons. Very little of this zinc enters into international commerce, however, since the U.S.S.R. is second only to the United States in annual slab zinc consumption.

Japan

With a productive capacity of 1.1 million short tons and a capacity utilization rate of 81 percent, Japan ranks as the world's second largest producer of slab zinc. Eight firms produce slab zinc in Japan using electrolytic refineries as well as retort smelters.

Canada

The third largest producer of slab zinc, Canada, has a productive capacity of 701,000 short tons and a capacity utilization rate of 78 percent. All Canadian slab zinc is produced by the electrolytic process. The Canadian producers, in order of slab zinc output in 1977, were:

(1) Cominco Ltd.
(2) Canadian Electrolytic Zinc (Noranda)
(3) Texasgulf Canada Ltd. (Subsidiary of Texasgulf, Inc., New York)
(4) Hudson Bay Mining and Smelting Co., Ltd.

West Germany

Five West German firms produced slab zinc in 1977, operating two electrolytic refineries and three zinc smelters. German slab zinc production of 374,000 short tons ranked fifth among the world's producers. 2/ The 1977 capacity of German firms to produce slab zinc was 478,000 short tons, with a utilization rate of 78 percent.

1/ Data for 1977 production and capacity for the U.S.S.R. are not available.

2/ U.S. ranks fourth in world production of slab zinc.

Australia

With production of slab zinc in 1977 of 274,000 short tons, Australia was the sixth ranked slab zinc producing country. Three Australian companies, the Broken Hill Associated Smelters Pty. Ltd., Electrolytic Zinc Co. of Australasia, and Sulphide Corp. Pty., Ltd., produced slab zinc. Productive capacity in 1977 was 347,000 short tons, with a utilization rate of 79 percent.

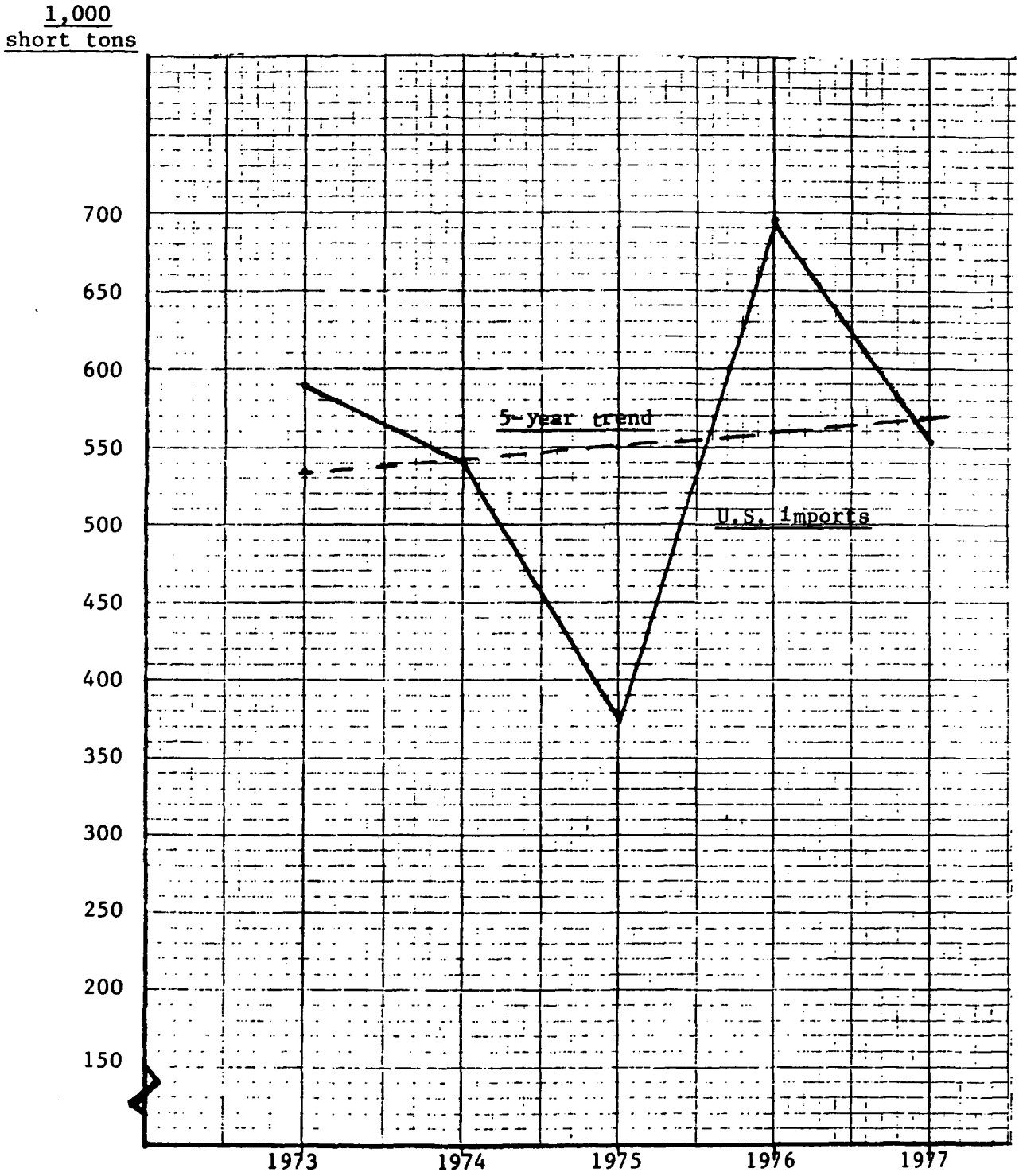
The Question of Increased Imports

U.S. imports

The 5-year trend in imports of slab zinc is slightly upward owing to a sharp increase in 1976 to a record high level of 695,000 short tons (fig. 1). Testimony at the public hearings indicated that this sharp increase was due to the recovery of the U.S. economy following the recession which began in late 1974 and continued into 1975. Although consumption in 1976 did recover significantly over 1975, it never reached the record-high level of 1974, gradually declining in the last quarter of 1976. Imports, however, continued to increase in 1976, reaching their highest level of the 1968-77 period, 18 percent higher than the previous peak of 587,000 short tons in 1973. The principal sources of imports in 1977 were Canada (43 percent), West Germany (8 percent), Belgium (7 percent), Zaire (6 percent), Finland (6 percent) and Mexico (6 percent). Australia, Spain, Peru, France, and Italy were also major sources.

In its petition, the Lead-Zinc Producers Committee alleged, "some foreign suppliers have compounded the serious injury to domestic producers by reducing exports to the United States in periods of shortage in the United States and abroad but escalating shipments during periods of weak demand in U.S. and world markets . . ." A comparison of the years 1973 and 1974 (a period of domestic shortage) with the years 1976 and 1977 (a period of weak worldwide demand) shows a number of countries have followed the pattern alleged by the petitioners. Imports increased between those periods by 450 percent from West Germany, by 221 percent from Mexico, by 2,500 percent from Spain, and by 485 percent from Italy.

Figure 1.--Slab zinc: U.S. imports for consumption, 1973-77.



Source: Compiled from official statistics of the U.S. Department of Commerce.

Although the imports from these countries follow the petitioners' alleged disruptive pattern, they also closely track world market conditions in 1974-77, by specified countries, as shown in the following tabulation (in thousands of short tons):

Country	1974		1975		1976		1977	
	Consumption	Production	Consumption	Production	Consumption	Production	Consumption	Production
West Germany	429	441	327	325	365	336	364	374
Italy	223	216	165	198	225	210	226	182
Spain	132	143	101	149	129	188	132	174
Mexico	63	151	58	169	65	193	66	194
United States	1,288	634	925	496	1,134	563	1,103	502
Other	2,901	3,138	2,361	2,688	2,726	2,915	2,668	3,070
Total	5,036	4,723	3,937	4,025	4,644	4,405	4,559	4,496

Except in the case of West Germany, imports from these countries made their sharpest increase in 1976, a year of comparative recovery from the recession period of 1975. World consumption grew 18 percent from 1975 to 1976; U.S. consumption grew about 23 percent.

Import data on slab zinc are detailed by sources in tables 4 and 5, and summarized in the following table.

Slab zinc: U.S. imports for consumption and production, 1973-77

Year	Imports	Production	Ratio of imports to production
	1,000 short tons	1,000 short tons	Percent
1973	587	666	88
1974	544	634	86
1975	375	496	76
1976	695	563	123
1977	555	502	111

Source: Compiled from official statistics of the U.S. Department of Commerce and the U.S. Bureau of Mines.

The ratio of U.S. imports to production

The trend in the ratio of imports to production is similar to that of imports, but more steeply upward. The ratio increased to 123 percent in 1976 and then declined to 111 percent in 1977 (Fig. 2). The trend was sharper because, although imports for the 5-year period were generally flat except for a large increase in 1976, production trended downward.

Imports of slab zinc by U.S. producers

Imports of slab zinc by U.S. primary and secondary producers are shown in the following table.

Slab zinc imports: by U.S. producers, 1973-77

(Short tons)

Company	1973	1974	1975	1976	1977
AMAX	***	***	***	***	***
ASARCO	***	***	***	***	***
National Zinc	***	***	***	***	***
New Jersey Zinc	***	***	***	***	***
Pacific Smelting 1/	***	***	***	***	***
Total	10,201	8,606	11,054	57,797	36,701

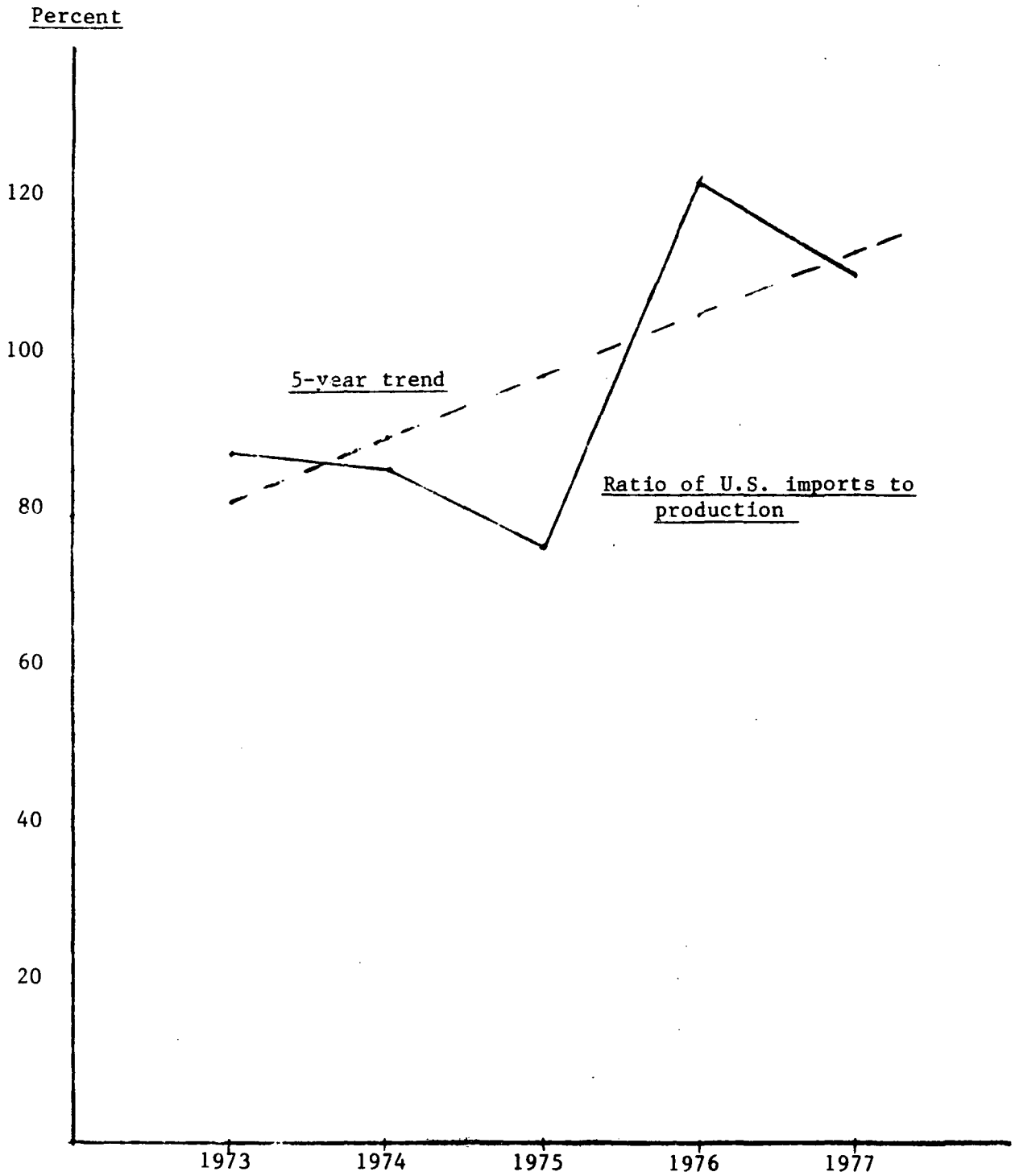
1/ Secondary producer.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

U.S. producers' share of total imports has trended upward since 1972, but remains well under 10 percent. It stood at 1.7 percent and 1.6 percent, respectively, in 1973 and 1974, then moved to 2.9 percent in 1975, and jumped substantially to 8.3 percent in 1976, falling back somewhat to 6.6 percent in 1977. Imports by domestic producers accounted for 15 percent of the surge of imports in 1976. Viewed in a longer perspective, they accounted for about 30 percent of the growth of average imports in a comparison of average inbound shipments in 1976-77 with those for 1973-75.

In response to questions at the public hearings, and from information supplied to the Commission, a number of reasons were given for the importations by the domestic producers. New Jersey Zinc and * * * imported to better serve their customers. New Jersey Zinc needed to develop a market for the capacity of their new electrolytic plant. Imports will be phased out as the plant comes on stream. * * *

Figure 2.--Slab zinc: Ratios of U.S. imports to production, 1973-77.



Source: Compiled from official statistics of the U.S. Department of Commerce and the U.S. Bureau of Mines.

ASARCO and AMAX import as the result of tolling arrangements with foreign producers. These arrangements call for concentrates to be shipped from foreign mines controlled by the U.S. producers to smelters in Japan and Germany, respectively. The concentrates are converted into slab zinc and shipped to the U.S. producers. * * *

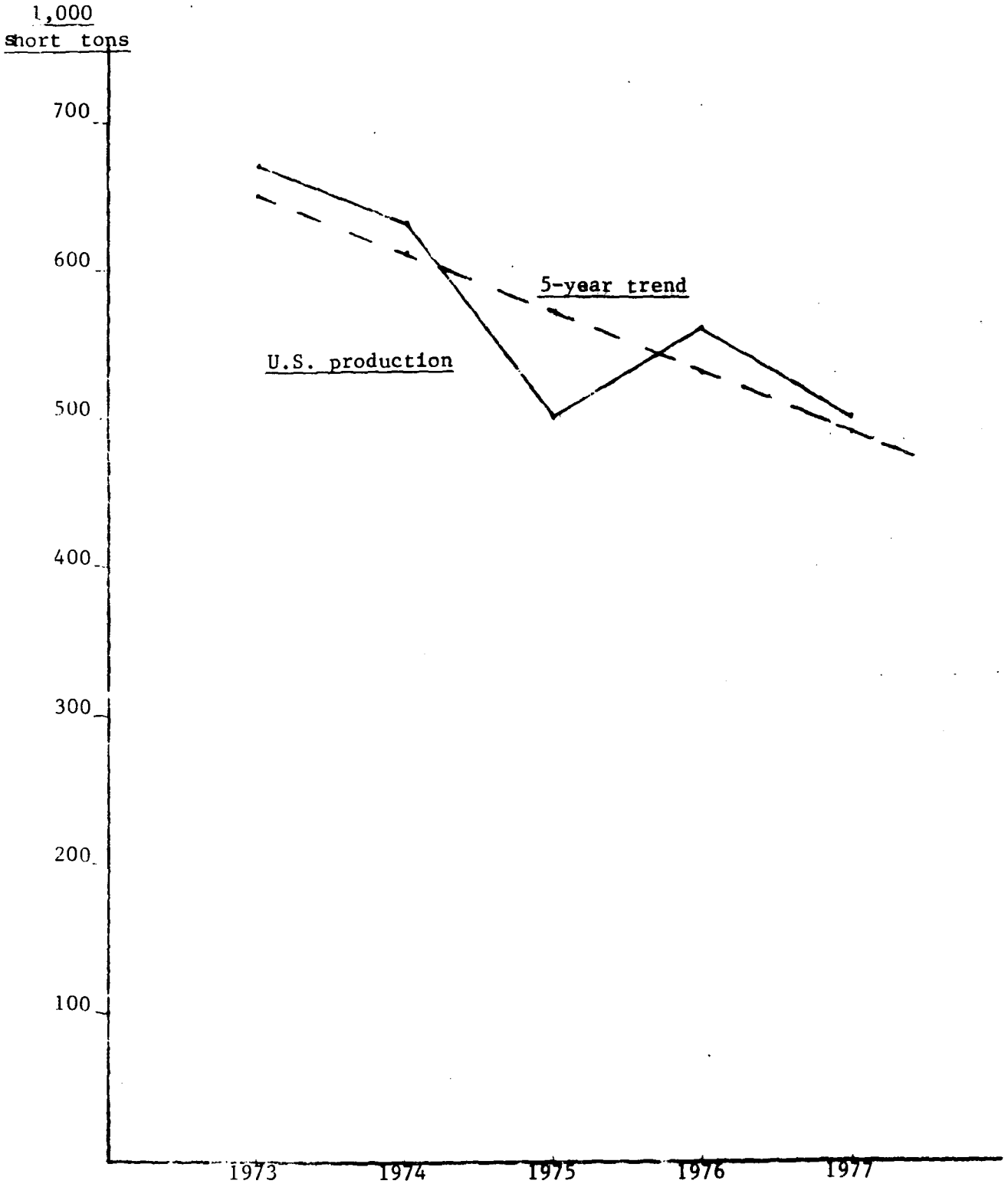
The Question of Serious Injury or the Threat Thereof to the Domestic Industry

U.S. production

Primary zinc.--Domestic production of slab zinc, as reported by the Bureau of Mines, trended downward in 1973 (fig. 3). Production of primary zinc declined from 1973 to 1975, increased 14 percent in 1976, and then decreased about 10 percent in 1977. A number of factors influenced U.S. production, among them the closing of the Anaconda Co., Great Falls, Mont., plant in 1973, the closing of the AMAX plant at Blackwell, Okla., in 1974, the phasing out of the ASARCO plant at Amarillo, Tex., in 1975, and the conversion of National Zinc's plant in 1976. These plant closures removed over 300,000 short tons of domestic production capacity. In addition to these closures, strikes at National Zinc in 1976 (3 months) and Bunker Hill in 1977 (4-1/2 months) disrupted production as did power curtailments owing to weather, machinery breakdown, and raw material supply difficulties. The downward trend in U.S. production generally paralleled world production until 1977, when U.S. production declined about 10 percent while world production increased about 3 percent. Petitioners estimated that these nonimport factors caused a loss in production in 1977 of 55,000 short tons.

In addition to the Bureau of Mines data, the Commission requested that the petitioners submit individual company production data. The results of the Commission's survey and Bureau of Mines data are summarized in the following table. Although the data presented are not comparable, the trends in production are the same. Differences in the data reflect differences in questionnaire design. Bureau of Mines data includes slab zinc produced by a firm and then used by that firm to produce zinc oxide. Commission data represents zinc produced and sold as slab zinc. Additional production data are presented in tables 6 and 7.

Figure 3.--Slab zinc: U.S. production, 1973-77



Source: Compiled from official statistics of the U.S. Bureau of Mines.

Slab zinc: U.S. production by primary producers as reported to the Commission and as reported by the U.S. Bureau of Mines, 1973-77:

Year	Commission data	Bureau of Mines data
	1,000 short tons	1,000 short tons
1973	493	583
1974	477	555
1975	387	438
1976	462	499
1977	394	450

Secondary zinc.--Recovery of zinc from secondary sources, as reported by the Bureau of Mines, followed the same trend as that of primary zinc, declining to a record 10-year low of 52,000 short tons in 1977.

Zinc-bearing ores and concentrates.--The trend in mine production remained level over the 5-year period 1973-77 although production in 1977 was at a 10-year low (table 6).

Capacity utilization

As shown in figure 4, domestic slab zinc primary and secondary capacity declined sharply from 1968 through 1972, after which the decline continued but at slower rates through 1977. Production capacity in 1977 was reported by the U.S. Bureau of Mines at 709,000 short tons. Statistics on capacity are detailed in tables 8 and 9, as well as in figures 4 and 5, and summarized in the following tabulation:

U.S. primary and secondary slab zinc production capacity, 1/ 1973-79

Year	Slab zinc production capacity			Ratio of production to capacity
	Primary	Secondary	Total	
	1,000 short tons	1,000 short tons	1,000 short tons	Percent
1973	741	40	781	85.3
1974	720	49	769	82.4
1975	674	49	723	68.6
1976	660	49	709	79.4
1977	660	49	709	70.8
1978 2/	668	49	717	3/
1979 2/	740	49	789	3/

1/ Prorated to account for plant closures during a given year.
2/ Forecast.
3/ Not available.

Source: Compiled from official statistics of the U.S. Bureau of Mines. Forecasts for 1978 and 1979 made by the staff of the U.S. International Trade Commission.

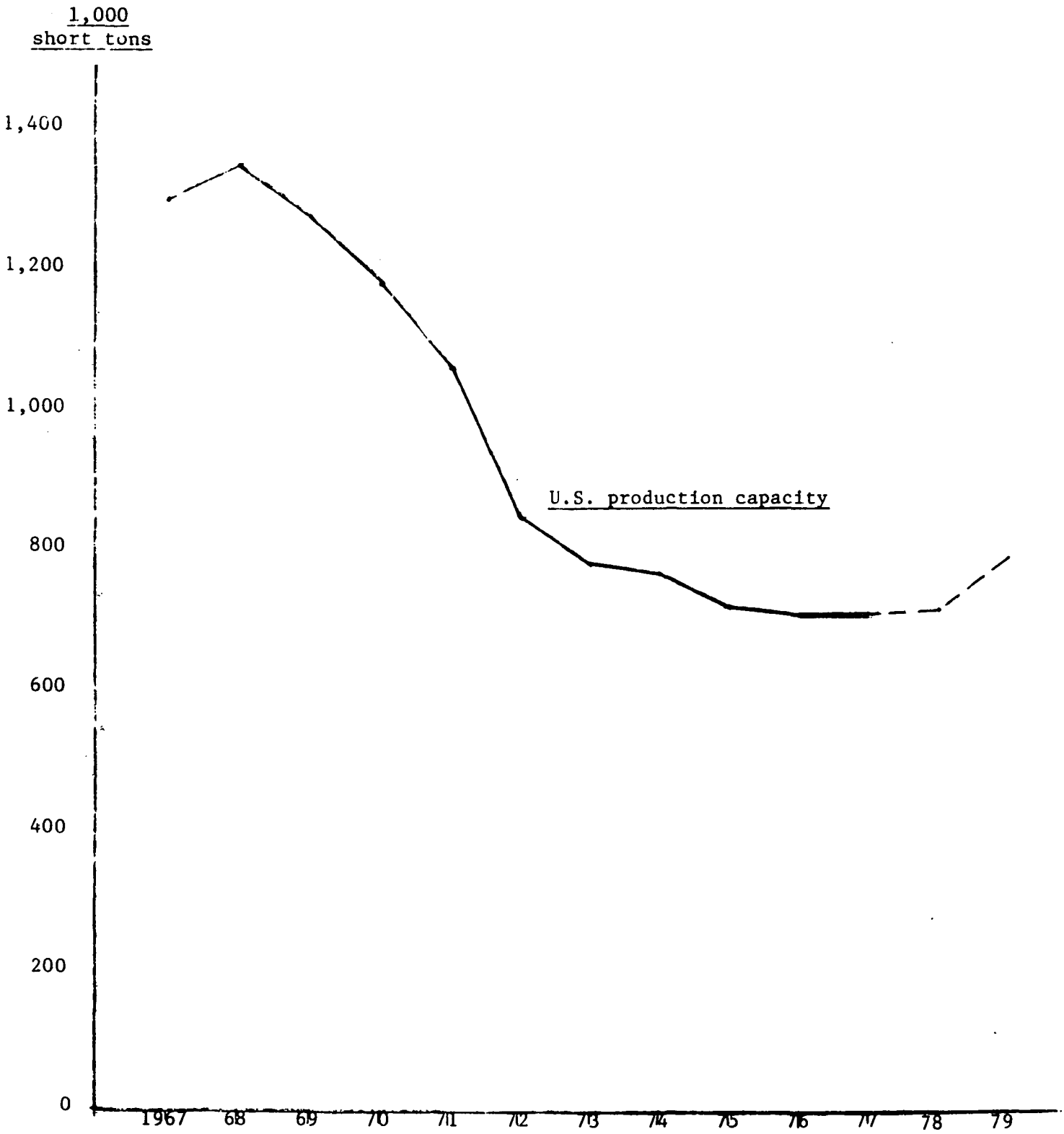
Capacity utilization averaged 84 percent during 1973 and 1974 before declining sharply in 1975. Optimum capacity utilization is thought to be about 90 percent of nameplate capacity. Utilization dropped to 69 percent in 1975 then rebounded to almost 80 percent in 1976 before declining to 71 percent in 1977.

In addition to the Bureau of Mines data, the Commission requested petitioners to submit capacity information. The results of the questionnaire responses of the six primary producers are as follows:

Period	Slab zinc capacity (1,000 short tons)
1973	662
1974	656
1975	652
1976	624

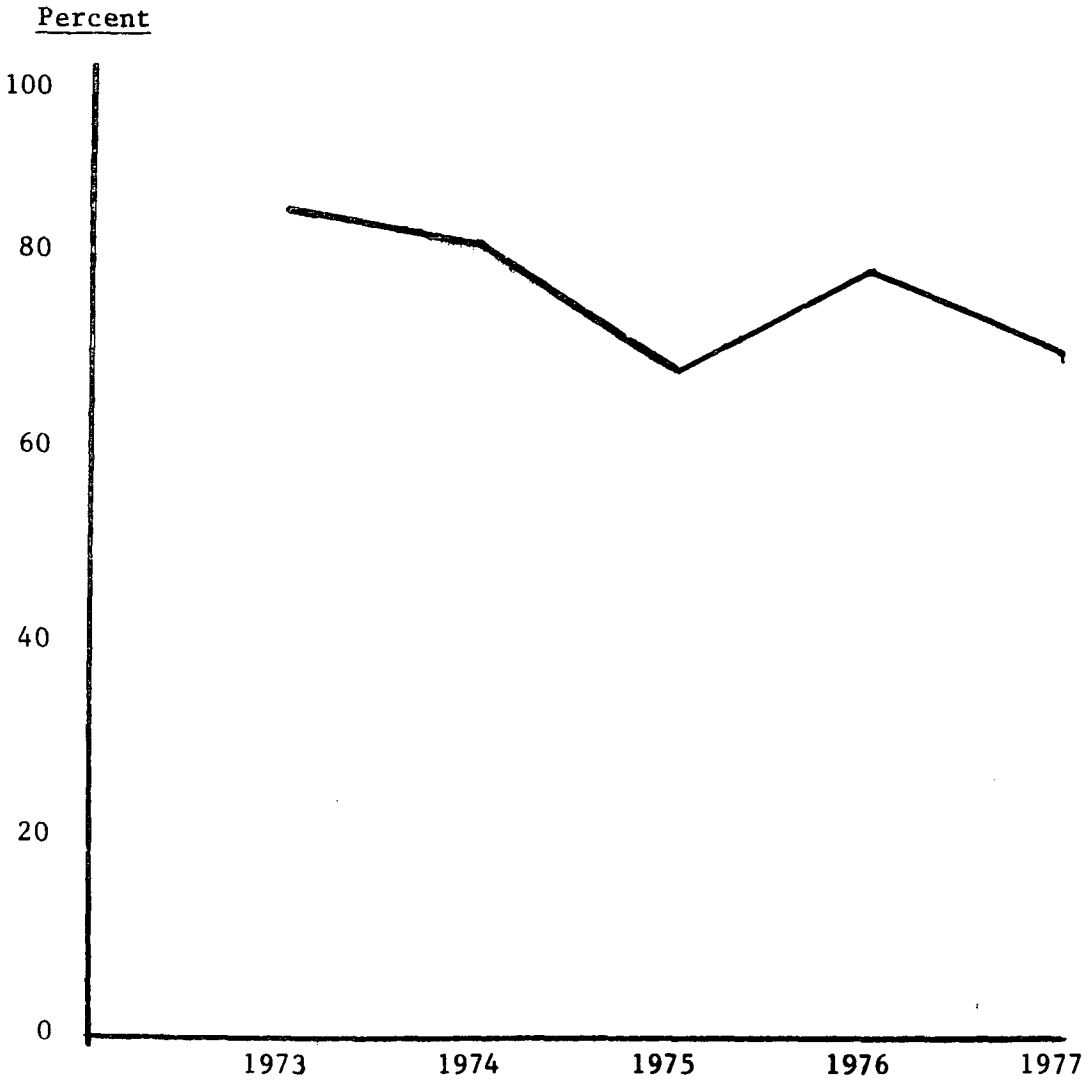
The data submitted in response to the Commission's questionnaires and that reported by the Bureau of Mines are not comparable because of differences in questionnaire design. The major differences relate to

Figure 4.-- Slab zinc: U.S. production capacity, 1973-77, and capacity forecasts for 1978-79.



Source: Compiled from official statistics of the U.S. Bureau of Mines. Capacity forecasts were made by the staff of the Commission.

Figure 5.--Slab Zinc: Ratios of U.S. production to capacity, 1973-77.



Source: Compiled from official statistics of the U.S. Bureau of Mines.

the product mix in a plant. In some cases, Bureau of Mines data do not take into account the variety of products being produced but reflect instead a nameplate slab zinc capacity for the facility.

The decline in total productive capacity over the last decade is attributable to the closing of eight smelting and refining plants between December 1968 and May 1975. 1/ In the case of these closings, the age of the facilities, costs of complying with pollution control regulations, and inability to secure adequate supplies of raw materials were cited as reasons for closing. These closures represented a decline in domestic capacity of about 570,000 short tons.

U.S. producers' shipments

U.S. producers' shipments followed the same trend during 1973-77 as production, as shown by data summarized in the following tabulation:

Period	U.S. producer shipments 1/ (1,000 short tons)
1973	663
1974	603
1975	445
1976	532
1977	501

1/ Producers' shipments equal production as reported by the Bureau of Mines minus changes in producers' inventories as reported by the American Bureau of Metal Statistics minus exports.

Actual sales of slab zinc followed the same trend as shown in the following table.

1/ National Zinc's plant was converted from a horizonal retort process to an electrolytic process. American Zinc's plant at Sauget, Ill. was reopened in 1973 by AMAX.

Slab zinc: U.S. primary producers' sales, by grades, 1973-77

Grade	1973	1974	1975	1976	1977
	Quantity (1,000 short tons)				
SHG	118	132	121	114	81
Other	333	296	193	275	288
Total	451	428	314	389	369
	Value (1,000 dollars)				
SHG	54,275	100,678	98,493	97,235	55,506
Other	139,379	208,011	149,280	204,373	195,815
Total	193,654	308,689	247,773	301,608	251,321
	Unit value (cents per pound)				
SHG	22.9	38.1	40.6	42.6	34.2
Other	20.9	35.1	38.6	37.1	33.9
Total	21.4	36.0	39.4	38.7	34.1

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Note.--U.S. producers' sales do not include intercompany shipments.

U.S. inventories

Producers' inventories.--U.S. producers' inventories of slab zinc, as reported by the American Bureau of Metal Statistics, rose steadily from 34,000 short tons in 1973 to 118,000 short tons in 1977, or by about 250 percent. Inventory-to-shipments (I/S) ratios rose almost fourfold over the same period. Data on inventories are detailed in table 10 and figure 6, and are also shown in the following table.

Slab zinc: U.S. producers' shipments and end-of-period inventories, 1973-77

Year	Producers' shipments 1/	Producers' end-of-period inventories	Ratio of inventories to shipments
	1,000 short tons	1,000 short tons	Percent
1973	663	34	5
1974	603	46	8
1975	445	90	20
1976	532	117	22
1977	501	118	24

1/ Producers shipments=production as reported by the Bureau of Mines minus changes in producers' inventories as reported by the ABMS minus exports.

Source: Compiled from statistics of the American Bureau of Metal Statistics and the U.S. Bureau of Mines.

Producers' inventories were relatively low in 1973-74 when demand for zinc was very high. Anticipation of the continuance of this demand through 1975 proved misleading and resulted in a substantial increase in inventory levels. Demand improved in 1976 but once again dropped sharply by the end of the year, causing inventory levels to increase and remain high through 1977.

Importers' inventories.--Slab zinc inventories held by importers (including merchants) declined slightly from 1973 to 1974 then increased rapidly in 1975 to 79,000 short tons, as shown in the following table. Levels continued to increase, rising to 99,000 short tons in 1977. Since 1973, importers' I/S ratios have generally paralleled the corresponding ratios of domestic producers, remaining below 10 percent until 1975, when they both rose sharply. An exception occurred in 1976, when the importers' I/S ratio fell substantially while domestic producers continued to experience inventory gains relative to shipments. In 1977, importers' stocks declined slightly, yielding an I/S ratio lower than that of domestic producers.

Slab zinc: U.S. importers' shipments and end-of-period inventories, 1973-77

Period	Importers' shipments	Importers' end-of-period inventories	Ratio of inventories to shipments
	1,000 short tons	1,000 short tons	Percent
1973	476	27	6
1974	392	21	5
1975	288	79	27
1976	567	108	19
1977	433	99	23

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Consumers' inventories.--Inventories held by consumers increased from 1973 to 1974, decreased almost 50 percent in 1975, increased again in 1976, then fell 28 percent in 1977, as seen in the following table.

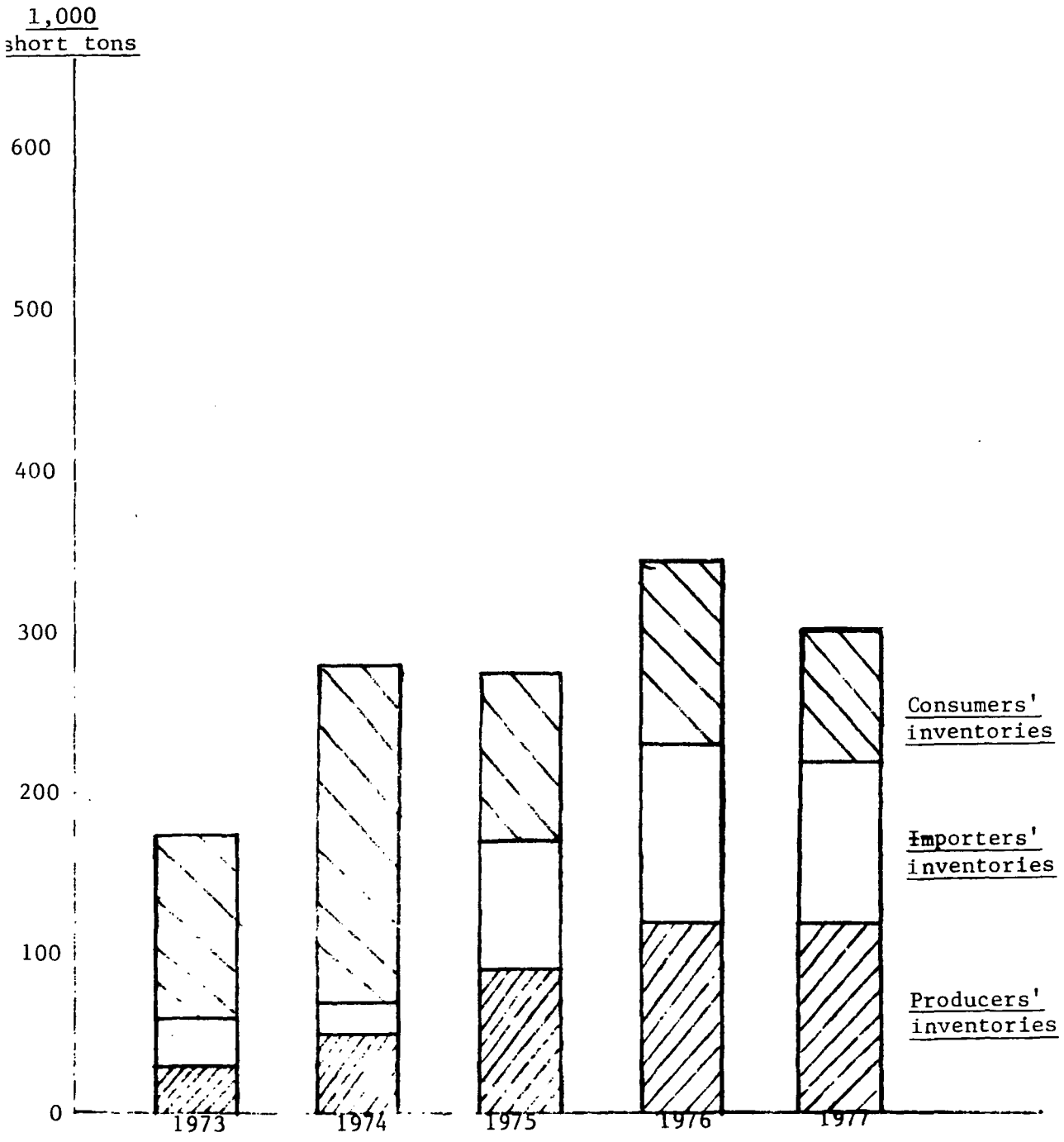
Slab zinc: U.S. consumption and consumers' end-of-period inventories, 1973-77

Period	Consumption	Consumers' end-of-period inventories	Ratio of inventories to consumption
	1,000 short tons	1,000 short tons	Percent
1973	1,504	114	8
1974	1,288	211	16
1975	925	107	12
1976	1,134	121	11
1977	1,103	87	8

Source: Compiled from official statistics of the U.S. Bureau of Mines.

Inventories in 1973 and 1974 were relatively low for producers and importers because of shortage induced purchases. Consumer's stocks were low in 1973 then jumped in 1974 as a result of overbuying. Producers and importers carried the bulk of inventories during the recession period of 1975 as reflected by their high I/S ratios. The situation was eased somewhat by a spurt of buying in the first half of 1976 but the demand

Figure 6.-- Slab zinc: U.S. producers', consumers', and importers' inventories, 1973-77.



Source: Compiled from official statistics of the U.S. Bureau of Mines and from data submitted in response to questionnaires of the U.S. International Trade Commission.

rapidly declined causing end-of-year inventories to climb once again. By 1977, importers and producers were once again bearing the burden of excessive stocks while consumers were able to cut their inventories to the lowest level in 5 years.

U.S. exports

Exports of slab zinc, as reported by the Department of Commerce, have been insignificant in relation to total domestic production (less than 3 percent), falling to an estimated 250 tons in 1977 as shown in the following tabulation:

Year	Short tons
1973	15,000
1974	19,000
1975	7,000
1976	4,000
1977	1/ 250

1/ Estimated.

Exports are directly influenced by price. As the world market price rose in 1973 and 1974, during a period of shortage, exports increased. As the world price began to fall in 1975 exports declined by over 60 percent and continued to decline through 1977.

Employment

Smelting and refining.--The average number of persons engaged in the manufacture of slab zinc is shown in the following table.

Average number of employees engaged in the production of slab zinc, total, associated employees, and production and related workers, by types of zinc, 1973-77

Year	All employees		Associated employees		Production and related workers	
	Primary	Secondary	Primary	Secondary	Primary	Secondary
1973	6,480	377	1,017	17	4,022	81
1974	5,587	409	1,039	22	3,787	95
1975	5,899	437	1,087	25	3,513	95
1976	6,028	460	1,190	28	3,447	93
1977	5,539	440	1,175	27	3,061	80

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

The average number of production and related workers employed by primary producers steadily declined from 4,022 workers in 1973 to 3,061 workers in 1977. The average number of production and related workers employed by secondary producers increased from 81 workers in 1973 to 95 workers in 1975, then fell back to 80 workers in 1977.

Declines in the average number of production workers were influenced by a number of nonimport related factors. AMAX, Inc. and ASARCO, Inc. closed plants in 1973 and 1975, respectively. During these periods the companies reported declines in production workers of * * * and * * * workers, respectively. The conversion of National Zinc's plant in 1976 from the horizontal retort process to the electrolytic process resulted in a reduction in workers. The company reported a * * * percent decline in the average number of production workers between 1976 and 1977. * * *

Man-hours.--Man-hours worked by production and related workers engaged in the production of slab zinc are detailed in table 11 and summarized as follows:

Year	Man-hours (thousands)
1973	8,694
1974	8,072
1975	7,200
1976	6,970
1977	6,228

The number of man-hours worked by production and related workers declined steadily from 8.7 million hours in 1973 to 6.2 million hours in 1977, or declined by 29 percent. This decline was influenced by the aforementioned plant closings as well as a number of other non-import factors. Workers at National Zinc were on strike for 3 months in 1976. * * * Man-hours worked by production and related employees at Bunker Hill declined over * * * percent in 1977 because of a 4-1/2 month labor strike.

Productivity.--The amount of slab zinc produced per man-hour increased by 40 percent from 1973 to 1977 as shown in the following tabulation:

Year	Output 1/ (per man-hour)
1973	0.05
1974	.06
1975	.06
1976	.07
1977	.07

1/ Short tons.

Increases in productivity are attributable to the shift in production processes from horizonal retort plants to electrolytic plants.

Mining.--The average number of workers employed in the U.S. mining industry and man-hours worked are shown in the following table.

Average number of employees engaged in the production of zinc concentrates, total, associated employees, and production and related workers, and man-hours worked by the latter, 1973-77

Year	All employees	Associated employees	Production and related workers	
	Number	Number	Number	Man-hours worked
1973	17,288	553	4,581	7,384
1974	17,631	572	5,025	8,328
1975	17,854	583	5,061	8,234
1976	17,877	617	4,985	8,057
1977	17,755	618	4,820	7,560

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

The average number of production and related workers and man-hours worked increased about 13 percent between 1973 and 1974 in contrast to the declines in the smelting and refining sector of the industry. The 1973-74 slab zinc shortage put pressure on smelters competing for concentrate supply, therefore the demand at the mine level was even greater than demand for the slab zinc itself. As the market slumped in 1975, mine employment and man-hours worked paralleled the declines in smelting and refining.

The following tabulation shows petitions to the U.S. Department of Labor for adjustment assistance on behalf of zinc mining and smelting employees. The petitions on behalf of mines are the result of actual mine closings. The petition on behalf of smelting workers at St. Joe Zinc represents layoffs due to production cutbacks. With the exception of Kerramerican, there have been no findings issued by the Labor Department as of May 10, 1978. The status of all petitioners to date is as follows:

Company	Number of workers	Type of operation	Date investigation instituted
Kerramerican (Blue Hill, Maine)	100	Mining	Sept. 27, 1977. 1/
Idarado Mining Co	140	do	Dec. 5, 1977.
ASARCO (New Market, Tenn.)	150	do	Jan. 10, 1978.
New Jersey Zinc (Gilman, Colo.)	163	do	Feb. 6, 1978.
Park City Ventures	340	do	Feb. 9, 1978.
Bunker Hill (Pen Orvile Mine)	150	do	Feb. 28, 1978.
Eagle Picher Mines	68	do	Mar. 21, 1978.
Eagle Picher Mines	65	do	Mar. 27, 1978.
Eagle Picher Mines	2/	do	Mar. 28, 1978.
Silver King Mining	6	do	Mar. 28, 1978.
St. Joe Zinc (Monaca, Pa.)	206	Smelting	Mar. 30, 1978.

1/ Certified as eligible for adjustment assistance.
2/ Not available.

Source: U.S. Department of Labor.

Prices

Slab zinc prices are available from a number of secondary sources which provide list prices or "quotes" for U.S. producers, European producers, U.S. importers and U.S. dealers or merchants. In addition, the London Metal Exchange (LME) quotations are used as a barometer for world market prices. Data on these pricing sources are presented in table 12.

Quarterly price data on imported and domestically produced slab zinc are presented in the following tables, and price comparisons are shown in figures 7 and 8. All prices presented were compiled from date submitted by producers, importers, and consumers in response to questionnaires of the U.S. International Trade Commission. Figure 7 shows that average net prices for imported and U.S.-produced slab zinc increased steadily during 1973; import prices were higher throughout the year. Import prices peaked in January-March 1974 and then generally declined through the remainder of 1974 and 1975. U.S. producer prices peaked during the fourth quarter of 1974 and remained below import prices until the fourth quarter of 1975. However, producer prices remained stable throughout the recession year of 1975 while import prices dropped. Prices in 1976 were relatively stable with only a slight difference between prices of imported and U.S-produced slab zinc. This difference widened somewhat in 1977 as both prices began a downward slide with import prices averaging about 4 percent less than U.S.-producer prices.

Figure 8 represents prices at which imported and U.S.-produced slab zinc actually were purchased by U.S. consumers. 1/ The graph shows the same trend in prices as that provided by importers and producers. Prices in late 1973 and throughout 1974 are generally higher than those reported by importers and producers but this is due to the "boom" nature of the period and the activities of traders. Prices reported by importers could reflect sales to traders rather than final consumers. As the demand for zinc grew in this period, the traders would release the zinc to final consumers at the higher prices consumers have reported. Prices from 1975 to 1977 are much closer, reflecting the more stable market conditions which emerged after 1974.

In mid-February 1978, four domestic primary slab producers announced new Prime Western grade quotes of 29 cents per pound. The remaining domestic producers lowered their prices shortly thereafter. In the beginning of March, however, LME began to rise, increasing from 21.5 cents per pound to 25.4 cents per pound in the first week of April. On April 18, 1978, Electrolytic Zinc of Australasia Ltd. raised its price for zinc sold outside of North America to 27.2 cents a pound. On April 28, 1978, Noranda Mines Ltd. of Canada raised its price outside North America from 24.9 cents per pound to 26.1 cents per pound. Also on April 28, Broken Hill Associated Smelters of Australia followed the earlier Australian price increase to 27.2 cents per pound. Analysis of the world metal markets indicates that these price increases may be premature. European producers are apparently operating at less than 70 percent of capacity and may not resist the temptation to increase production at the higher prices which would probably weaken prices. However, if these price increases prove to be effective, they should be reflected in the U.S. market as well.

1/ The U.S. Bureau of Mines canvasses over 600 zinc-consuming firms annually. The Bureau provided a list of the top 80 consumers (accounting for about 85 percent of consumption), 40 of which were randomly selected to receive Commission questionnaires.

Slab zinc: Weighted average lowest net prices 1/ for sales of imported and U.S.-produced products, by grades and by quarters, 1973-77

(In cents per pound)

Period	Special High Grade		Other	
	Imported	U.S.-produced	Imported	U.S.-produced
1973:				
Jan.-Mar	20.1	19.7	19.8	19.2
Apr.-June	21.1	20.6	21.0	20.3
July-Sept	23.6	21.2	21.9	20.3
Oct.-Dec	28.6	22.5	28.4	23.0
1974:				
Jan.-Mar	35.7	32.9	33.3	32.5
Apr.-June	38.8	36.4	34.3	35.5
July-Sept	40.6	38.3	36.9	37.8
Oct.-Dec	40.1	40.2	39.6	39.5
1975:				
Jan.-Mar	39.2	39.5	39.0	39.0
Apr.-June	39.2	39.1	38.8	37.6
July-Sept	38.9	39.2	38.8	38.6
Oct.-Dec	38.3	38.9	38.6	37.3
1976:				
Jan.-Mar	36.4	36.7	36.5	36.7
Apr.-June	36.5	33.8	36.5	36.7
July-Sept	37.1	36.7	36.7	36.8
Oct.-Dec	36.7	37.5	36.0	34.9
1977:				
Jan.-Mar	36.3	36.6	36.5	36.7
Apr.-June	35.0	34.8	31.9	34.4
July-Sept	32.6	34.4	32.2	33.9
Oct.-Dec	28.8	30.7	29.9	30.7

1/ Delivered price to customers in the United States.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Slab zinc: Weighted average net prices 1/ for sales of imported and U.S.-produced products, by grades and by quarters, 1973-77

(In cents per pound)

Period	Special High Grade		Other	
	Imported	U.S.-produced	Imported	U.S.-produced
1973:				
Jan.-Mar	21.2	20.4	20.4	19.5
Apr.-June	22.8	21.0	21.6	20.5
July-Sept	26.8	21.2	23.9	20.4
Oct.-Dec	29.6	24.2	30.1	23.3
1974:				
Jan.-Mar	48.0	33.3	33.3	33.0
Apr.-June	42.5	36.2	37.1	35.9
July-Sept	43.9	38.9	40.1	38.2
Oct.-Dec	42.3	40.2	40.0	39.5
1975:				
Jan.-Mar	40.9	39.4	39.2	39.0
Apr.-June	40.3	39.4	39.1	38.7
July-Sept	39.5	39.1	39.1	38.7
Oct.-Dec	37.7	39.1	38.8	38.6
1976:				
Jan.-Mar	36.4	36.1	36.9	36.7
Apr.-June	36.8	36.1	36.3	36.7
July-Sept	37.1	37.0	36.9	36.8
Oct.-Dec	36.4	37.1	36.4	36.6
1977:				
Jan.-Mar	36.3	36.1	36.8	36.7
Apr.-June	34.7	35.5	35.1	34.7
July-Sept	32.1	34.0	33.0	33.6
Oct.-Dec	29.7	30.8	30.6	30.8

1/ Delivered price to customers in the United States.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Slab zinc: Weighted average lowest net prices 1/ paid by U.S. consumers for imported and U.S.-produced products, by grades and by quarters, 1973-77

(In cents per pound)

Period	Special High Grade		Other	
	Imported	U.S.-produced	Imported	U.S.-produced
1973:				
Jan.-Mar	19.2	19.5	19.0	19.2
Apr.-June	21.2	22.1	20.1	20.6
July-Sept	22.8	21.7	21.4	21.3
Oct.-Dec	34.5	29.5	29.4	24.4
1974:				
Jan.-Mar	35.1	37.7	32.1	33.0
Apr.-June	41.7	42.3	35.9	36.2
July-Sept	43.0	39.0	38.3	38.0
Oct.-Dec	41.9	37.4	39.1	33.8
1975:				
Jan.-Mar	37.3	39.4	38.6	39.0
Apr.-June	38.7	37.4	39.1	38.6
July-Sept	37.2	36.9	39.1	39.2
Oct.-Dec	37.2	36.9	39.0	39.0
1976:				
Jan.-Mar	36.6	35.6	37.1	37.3
Apr.-June	36.9	37.1	37.1	37.4
July-Sept	37.3	37.4	37.2	37.9
Oct.-Dec	37.2	37.4	38.1	37.4
1977:				
Jan.-Mar	35.6	36.2	37.1	37.3
Apr.-June	34.4	34.6	34.3	35.1
July-Sept	32.2	34.3	32.3	34.2
Oct.-Dec	29.5	30.1	32.5	31.0

1/ Delivered price to customers in the United States.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Slab zinc: Weighted average net prices 1/ paid by U.S. consumers for imported and U.S.-produced products, by grades and by quarters, 1973-77

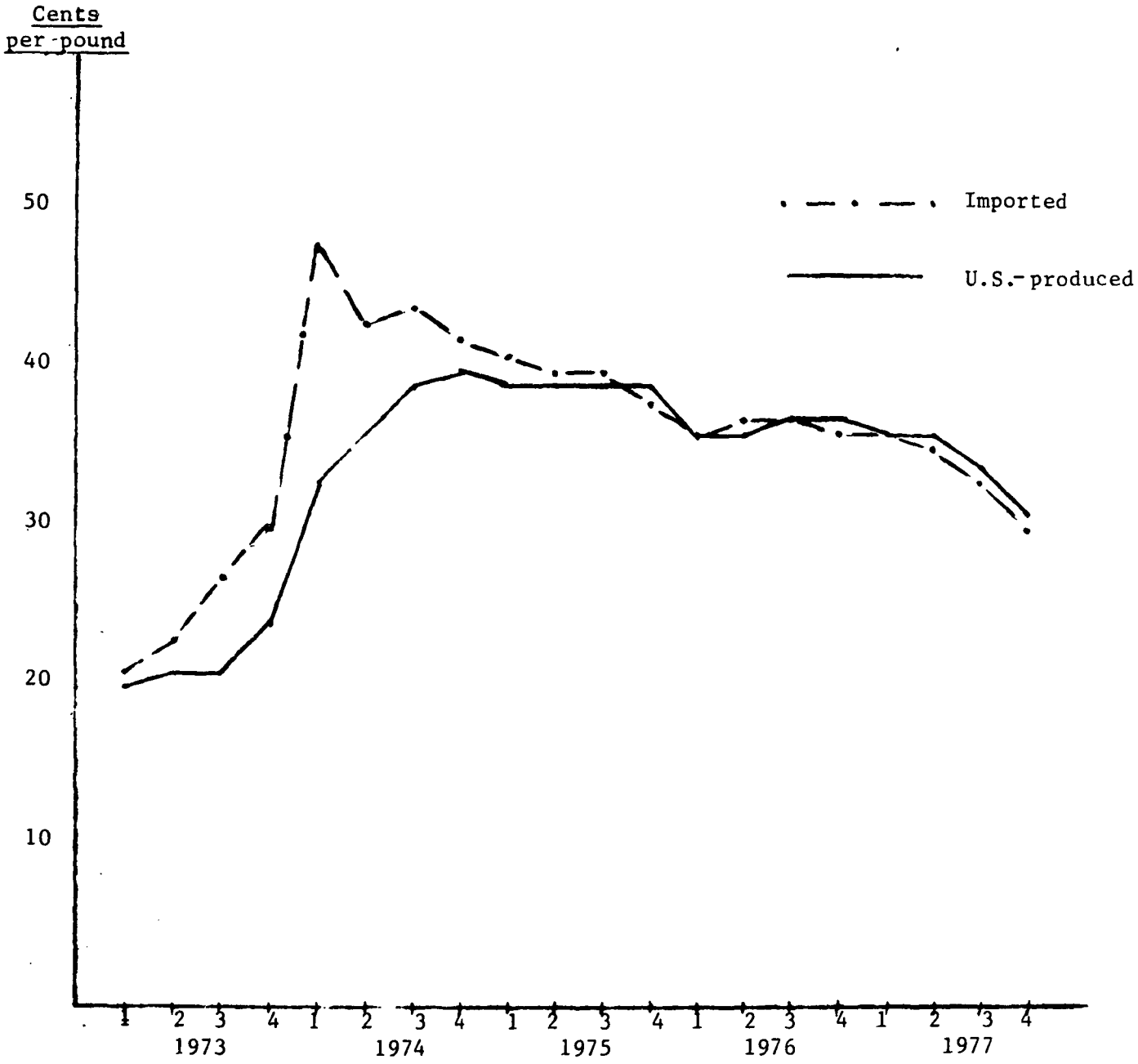
(In cents per pound)

Period	Special High Grade		Other	
	Imported	U.S.-produced	Imported	U.S.-produced
1973:				
Jan.-Mar	20.5	20.1	20.0	20.0
Apr.-June	22.7	22.4	21.4	21.9
July-Sept	27.3	24.8	24.1	22.2
Oct.-Dec	35.7	32.9	29.1	26.3
1974:				
Jan.-Mar	43.1	43.4	32.9	35.7
Apr.-June	48.8	43.6	36.6	37.9
July-Sept	49.1	44.6	40.1	39.4
Oct.-Dec	47.1	41.4	40.7	39.7
1975:				
Jan.-Mar	38.5	39.6	39.7	39.1
Apr.-June	38.8	37.4	39.9	39.1
July-Sept	36.9	36.9	40.0	39.3
Oct.-Dec	37.4	37.3	39.3	39.0
1976:				
Jan.-Mar	36.1	36.0	37.7	37.5
Apr.-June	37.1	37.2	37.7	37.9
July-Sept	37.2	37.6	37.5	37.9
Oct.-Dec	37.2	37.5	37.7	37.4
1977:				
Jan.-Mar	35.8	36.5	37.4	37.2
Apr.-June	34.8	36.0	31.2	35.8
July-Sept	32.8	34.1	33.9	34.4
Oct.-Dec	29.8	31.1	31.1	31.9

1/ Delivered price to customers in the United States.

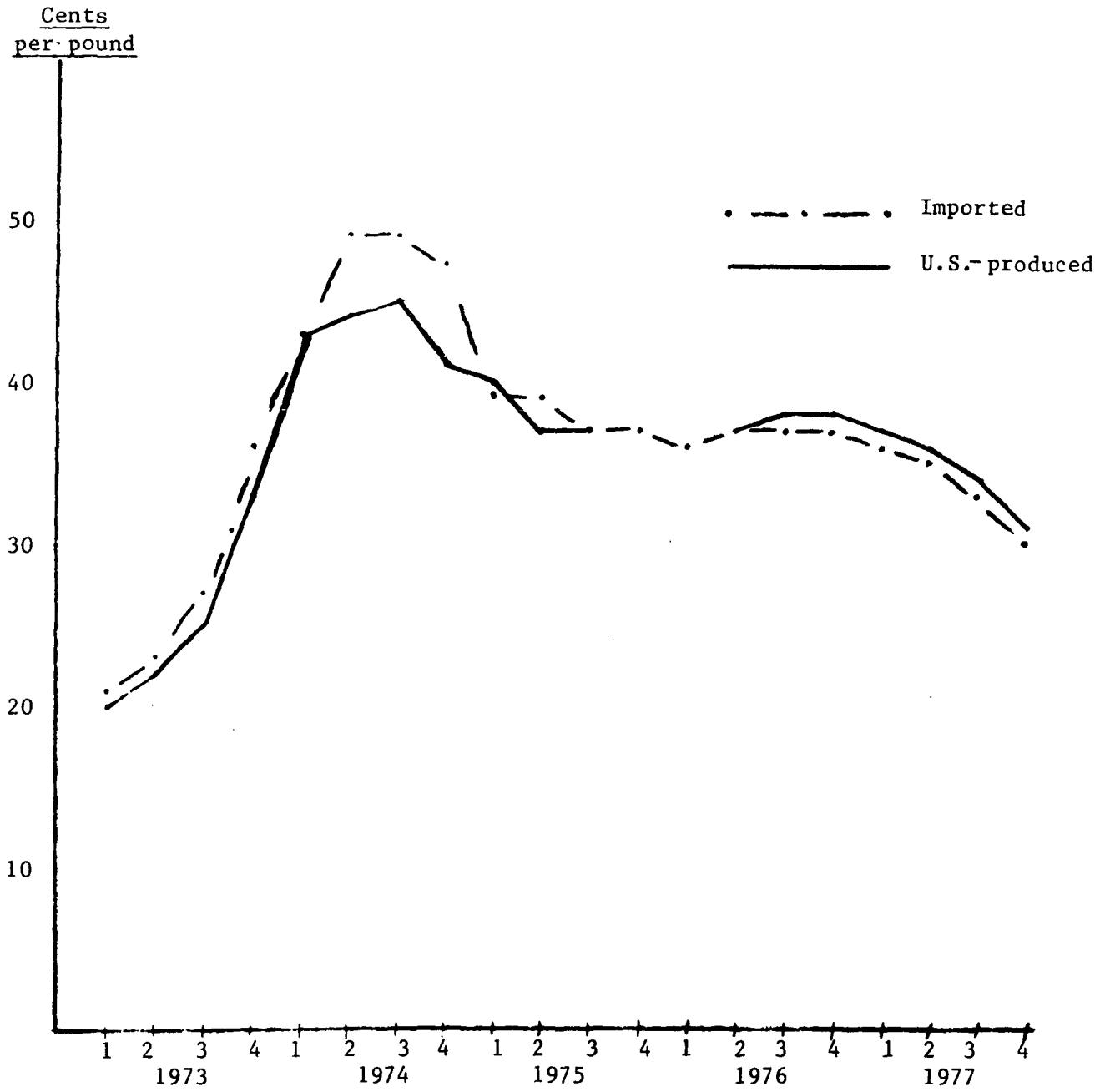
Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Figure 7.-- Slab zinc: Weighted average net prices received for sales of Special High Grade, by quarters, 1973-77.



Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Figure 8.-- Slab zinc: Weighted average net prices paid by U.S. consumers for Special High Grade, by quarters, 1973-77.



Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Profit-and-loss experience of U.S. producers on smelting and refining operations

Overall operations of the establishments.--Net operating profit of the six U.S. primary slab zinc producers and two secondary slab zinc producers on their overall operations in which slab zinc was produced increased from $48.3 million in 1973 to $122 million in 1974, and then declined to $1.2 million in 1977, as shown in the table on page A-41. Profit as a percentage of net sales was 9.9 percent in 1973, 16.3 percent in 1974, and 0.2 percent in 1977.

Operations on slab zinc.--Net operating profit of the six U.S. primary slab zinc producers and two secondary slab zinc producers on their slab zinc operations increased from $20.3 million in 1973 to $48.7 million in 1974, declined in 1975, and increased to $10.0 million in 1976; in 1977 a loss of $11.4 million was experienced. As a percentage of net sales, net operating profit was 7.7 percent in 1973 and 12.0 percent in 1974; net operating loss was 4.0 percent of net sales in 1977.

The impact of production costs (including raw materials, power and labor) and declining prices on slab zinc profits can be seen in the following ratios of cost of sales to sales:

	Percent
1973	87
1974	84
1975	93
1976	92
1977	98

* * * Because five of the six primary producers are vertically integrated the accounting methods used to transfer the cost of zinc concentrates from company-owned mines to smelters raise problems for analysis. In the case of most producers such concentrates were transferred at market value based on actual or hypothetical sales of concentrates to third parties. * * * Although it has been argued by opponents to the petition that this method would allow profits to be recorded at the mining level while losses would be shifted to the smelter * * *.

A comparison of slab zinc producers financial performance with that of other industries is shown in the following table.

Profit-and-loss experience of 6 U.S. primary producers and 2 U.S. secondary producers of slab zinc, by types of operation, 1973-77

Item	1973	1974	1975	1976	1977
	Total establishment operations				
Net sales---------1,000 dollars--	485,899	753,880	492,576	571,873	509,495
Cost of sales----------do----	414,316	599,100	428,727	510,739	476,104
Gross profit----------do----	71,583	154,780	63,849	61,134	33,392
General, selling, and administrative expenses---1,000 dollars--	23,326	32,891	32,870	31,529	32,164
Net operating profit-------do----	48,257	121,889	30,979	29,605	1,226
Other income or (expense)--do----	1,481	700	797	(4,910)	(5,352)
Net profit or (loss) before income taxes----1,000 dollars--	49,737	122,589	31,775	24,696	(4,125)
Ratio of net operating profit to net sales----------percent--	9.9	16.3	6.3	5.2	0.2
	Operations on slab zinc				
Net sales---------1,000 dollars--	264,740	404,522	291,365	347,181	288,116
Cost of sales----------do----	230,982	340,619	270,254	319,262	282,165
Gross profit----------do----	33,757	63,903	21,111	27,919	5,951
General, selling, and administrative expenses---1,000 dollars--	13,135	15,235	17,481	17,916	17,355
Net operating profit-------do----	20,263	48,668	3,630	10,003	(11,403)
Other income or (expense)--do----	762	791	(258)	(4,683)	(4,678)
Net profit or (loss) before income taxes----1,000 dollars--	21,385	49,459	3,372	5,320	(16,081)
Ratio of net operating profit to net sales----------percent--	7.7	12.0	1.2	2.9	(4.0)

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Note: Because of rounding, figures may not add to the totals shown.

Comparative ratios of net operating profits to net sales for slab zinc operations, primary metals and all U.S. manufacturing, 1973-77

(In percent)

Year	Ratios of net operating profit to net sales for--		
	Slab zinc operations	Primary metals	All U.S. manufacturing
1973	7.7	7.2	8.0
1974	12.0	10.7	8.7
1975	1.2	6.3	7.4
1976	2.9	5.5	8.7
1977	(4.0)	3.4	8.6

Although slab zinc operating profit ratios exceeded those of primary metal producers and all U.S. manufacturers in 1973 and 1974, the ratio for slab zinc dropped drastically in 1975. The ratio recovered slightly in 1976 and then fell to a negative return in 1977. Operating profit ratios for primary metal also dropped in 1975 and continued to drop through 1977, but much less precipitously than slab zinc.

Investment in productive facilities.--In order to further measure the financial condition of the domestic industry, questionnaire data were developed on both the book and replacement value of net assets employed (investment) in the production of slab zinc. As shown in the table on page A-43, the ratio of net operating profit to investment rose from 1973 to 1974 and then declined to negative returns in 1977.

Research and development expenditures.--The six primary slab zinc producers had combined research and development costs as follows:

	1,000 dollars
1973	2,063
1974	2,170
1975	2,958
1976	3,587
1977	3,759

These costs were incurred in contributions to the Lead-Zinc Study Group (a product research and development activity), production process improvements at various plants, and product development activities by each of the producers.

Investment in productive facilities and net operating profit of 6 U.S. primary slab zinc producers, 1973-77

Item and year	Investment in productive facilities		Net operating profit or (loss)	Ratio of net operating profit to investment in productive facilities	
	Net book value	Replacement value		Net book value	Replacement value
	Million dollars	Million dollars	Million dollars	Percent	Percent
Overall operations:					
1973	139	1/	44	32	1/
1974	134	1/	104	78	1/
1975	260	1/	26	10	1/
1976	309	1/	30	10	1/
1977	327	868	4	1	.05
Operations on slab zinc:					
1973	87	1/	21	24	1/
1974	94	1/	47	50	1/
1975	158	1/	3	2	1/
1976	207	1/	10	5	1/
1977	224	558	(11)	Negative	Negative

1/ Not available.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Profit-and-loss experience of U.S. producers on mining

Profit-and-loss data submitted to the Commission by nine U.S. mining companies are shown in the table on A-45. Net operating ratios for zinc concentrates increased sharply in 1974 when demand for concentrates was high, then dropped off in 1975, and continued to decline until negative returns were recorded in 1977. Overall mine operations followed the same general pattern but ratios did not drop as sharply in 1975 and have remained relatively high throughout 1977. The difference in performance between overall operations and zinc concentrates is attributable to the profitability of certain ores, such as cadmium and lead which are normally found in combination with zinc.

The Question of Imports as a Substantial Cause of Serious Injury

U.S. consumption and the ratio of imports to consumption

U.S. consumption of slab zinc declined from 1973 to 1975, increased in 1976, and then declined again in 1977, as shown in the following table. Imports of slab zinc have grown in relation to U.S. consumption except for 1977, when the ratio of imports to consumption fell 18 percent. This decline was attributable to the drop in imports of 20 percent.

Slab zinc: U.S. imports for consumption and U.S. consumption, 1973-77

Year	Imports	Consumption	Ratio of imports to consumption
	1,000 short tons	1,000 short tons	Percent
1973	587	1,504	39
1974	544	1,288	42
1975	375	925	41
1976	695	1,134	61
1977	555	1,103	50

Source: Compiled from official statistics of the U.S. Bureau of Mines and the Department of Commerce.

Profit-and-loss experience of 9 U.S. mining companies on their overall operations and their zinc concentrate operations, 1973-77

Item	1973	1974	1975	1976	1977
	Overall operations				
Net sales----------1,000 dollars--	170,913	284,277	229,914	250,260	227,172
Cost of sales----------do----	98,890	136,425	137,888	161,585	155,057
Gross profit----------do----	72,023	147,852	92,027	88,675	72,115
General, selling, and administrative expenses---1,000 dollars--	13,127	17,260	15,724	15,879	15,457
Net operating profit-------do----	58,896	130,592	76,303	72,795	56,658
Other income or (expense)--do----	(2,136)	(1,401)	(3,163)	(3,208)	(2,689)
Net profit before income taxes----------1,000 dollars--	56,759	129,191	73,140	69,587	53,970
Ratio of net operating profit to net sales----------percent--	34	46	33	29	25
	Zinc concentrates				
Net sales----------1,000 dollars--	69,553	137,949	111,298	119,748	86,820
Cost of sales----------do----	52,157	73,861	76,766	88,092	81,548
Gross profit----------do----	17,395	64,089	34,532	31,657	5,271
General, selling, and administrative expenses---1,000 dollars--	4,191	4,633	5,148	5,932	5,583
Net operating profit-------do----	13,205	59,455	29,383	25,725	(311)
Other income or (expense)--do----	(1,036)	(580)	(2,269)	(1,973)	(1,494)
Net profit or (loss) before income taxes----1,000 dollars--	12,169	58,874	27,115	23,751	(1,805)
Ratio of net operating profit to net sales----------percent--	19	43	26	21	(.04)

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Note: Because of rounding, figures may not add to the totals shown.

The import to consumption ratio traditionally has been used to measure relative market shares as well as changes in these shares. In the subject investigation, the presence of a third source of supply make adjustments to the traditional ratio necessary. The presence of GSA stockpile releases in the market in 1973 and 1974 represent that third source of supply. Although most of these releases were made through the U.S. primary producers, the exact origin of the metal was unknown and could well have consisted of metal imported in prior years. The following table shows market shares for each source of supply.

Slab zinc: U.S. consumption, by source of supply, 1973-77

Year	GSA stockpile releases		U.S. producers shipments		Imports	
	1,000 short tons	Percent of consumption	1,000 short tons	Percent of consumption	1,000 short tons	Percent of consumption
1973	273	18	663	44	568	38
1974	285	22	603	47	400	31
1975	6	1/	445	49	474	51
1976	0	-	532	47	602	53
1977	0	-	501	45	602	55

If GSA stockpile releases are treated as a third source of supply, the percent of consumption supplied by U.S. producers would be relatively stable through 1977. Increases in market share by imports prior to 1977 would be the the result of the absence of stockpile releases not a decline in producer market share.

An additional factor to be considered is the role of imports by U.S. producers. Imports by U.S. producers in 1973-77 were as follows:

Year	1,000 short tons	Percent of total imports
1973	10	1.7
1974	8	1.5
1975	11	2.9
1976	58	8.5
1977	37	6.7

If imports by U.S. producers are treated as producers' shipments rather than as imports for consumption, the percentage distribution of the market would have been as follows (in percent):

Year	GSA	U.S. producers	Imports
1973	18	44	38
1974	22	47	31
1975	1/	49	51
1976	-	52	48
1977	-	49	51

1/ Less than 0.5 percent.

Although the change in shares due to producers' imports is insignificant for 1973-75, the impact of such a reallocation becomes significant in 1976 and 1977. The percent of consumption supplied by U.S. producers would be 11 percent higher in 1976 and 8 percent higher in 1977.

Possible causes of serious injury, or the threat of serious injury, other than imports

Impact of environmental and safety regulations.--The smelting and refining industry is a candidate for possible regulation in both the environmental and safety areas. The impact of safety regulations has apparently not been consequential in the industry but environmental regulations have been.

During 1968-75, eight primary zinc smelters or refineries closed in the United States. Statements by company officials given at the time of the closings attribute the shutdowns to obsolescence, lack of feed materials and environmental costs. In a 1972 study by Arthur D. Little, Inc., 1/ for the Environmental Protection Agency, the maximum impact of pollution control costs was expected to fall on the horizontal retort plants of AMAX, ASARCO, and National Zinc. All of these companies subsequently shut down their horizontal retort operations. 2/ The shutdown of these plants, as well as the five others, not only reduced U.S. primary

1/ "Economic Impact of Anticipated Pollution Abatement Costs, Primary Zinc Industry," Report to Environmental Protection Agency, Part 3, Arthur D. Little, Inc.

2/ National Zinc's plant was converted to an electrolytic process.

smelter capacity by about 50 percent but also had its impact on mining. As pointed out in the EPA study,

> . . . the closing of all three horizontal retort plants would have an impact on mining activity in the tri-state area (Missouri, Oklahoma, Kansas) and extend to the western states since only two or three outlets would remain in the west. This can be expected to limit current and future production in the west to the amount that could be treated by the smelters. 3/

The impact of environmental regulations is thus twofold. The anticipation of increased costs to comply with regulations, when considered with other financial factors, led to the closing of plants and the removal of capacity from the domestic industry. This loss of capacity led to a decline in the amount of ore necessary to supply the compacted industry, which led to the curtailment of mine production and the exploration for new sources.

The Commission requested data on the cost of compliance with Federal and State enviromental requirements. The data submitted by primary producers in response to the request are shown in the following tabulation.

Year	Expenditures to meet EPA regulations	
	Total cost	Increased production cost
	1,000 dollars	Cents per pound
1973	6,253	0.09
1974	10,598	.19
1975	29,852	.34
1976	45,280	.49
1977	27,108	.74

Impact of changes in ore supply in the United States.--The availability of adequate supplies of zinc concentrates is essential to the U.S. zinc smelting industry. In the last decade several U.S. firms have withdrawn from zinc smelting because of failure to obtain adequate concentrates, and the industry currently imports from 40 to 50 percent of its concentrate requirements. The following table shows the average grade of ores, recovery rates, and grade of concentrates for the industry.

1/ Arthur D. Little, Inc., op. cit., p. 31.

Zinc concentrates: Average millhead grades, average metallurgical recovery rates, and average grades of concentrates, 1973-77

(In percent)

Year	Millhead grade	Metallurgical recovery rate	Grade of concentrates
1973	5.02	89.72	55.63
1974	4.83	89.42	55.97
1975	4.48	88.63	55.86
1976	4.67	89.93	57.01
1977	4.68	89.63	57.02

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

The average millhead grade indicates the percentage of zinc contained in the ore being mined. This percentage has declined slightly since 1973 but is typical of U.S. ore deposits, which usually contain larger shares of lead, silver, cadmium, and other minerals. The average grade of Canadian ores was 5.1 percent in 1976, according to the Canadian Department of Energy, Mines, and Resources. The grades of ores range from 3 to 10 percent worldwide, and average 5 percent. The grade of concentrates has increased since 1973, indicating an improvement in recovery techniques at the concentrator level.

The amount of domestic ore available for recovery has steadily increased in the last 20 years. According to Bureau of Mines data, U.S. zinc ore reserves increased to 20 percent of world zinc ore reserves in 1973-75 from 14 percent in 1963-65 and 12 percent in 1953-55. The United States had enough ore to last 63 years in 1973-75, a great increase from the 23-years' supply known in 1963-65 and the 17-years' supply known in 1953-55. On the other hand, the world had only enough ore to last 23 years in 1973-75, a small increase from the 21-years' supply known in 1963-65 and a significant decrease from the 27-years' supply known in 1953-55. Thus domestic ore availability has improved as world ore availability has worsened.

Impact of substitute materials and changes in demand.--The zinc industry has incurred sharp competition from substitute materials in both of its major applications. The use of specific grades of zinc for galvanizing (Prime Western and other grades) and for diecasting (Special High Grade only), allows the segregation of shipments to these two markets. The following table shows U.S. primary producer sales, by grade of slab zinc.

Slab zinc: U.S. primary producers sales, by grade, 1973-77

Year	SHG	Other grades
	1,000 short tons	1,000 short tons
1973	118	333
1974	132	296
1975	121	193
1976	114	275
1977	81	288

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

The decline in sales of Special High Grade zinc is attributable to a decline in demand for zinc diecastings. The principal market for diecasting--automobiles--has decreased its use of die-cast zinc by about 50 percent since 1975. The demands of energy conservation have forced the EPA to require increased mileage ratings from the automobile industry. In order to comply with these demands, the auto industry has cut the weight of its vehicles by reducing the size of the cars and using lighter weight materials. Use of plastics, aluminum, and high strength steel has increased, while zinc use has declined. In 1976, the average car contained 60 pounds of zinc diecastings. This was cut to 30 pounds in 1978 models. The use of one-sided zinc galvanized steel in automobiles has increased during the same period.

APPENDIX A

NOTICE OF INVESTIGATION AND HEARING

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

UNALLOYED UNWROUGHT ZINC
[TA-201-31]

Notice of Investigation and Hearing

Investigation instituted. Following receipt of a petition on December 20, 1977, filed by the Lead-Zinc Producers Committee, Washington, D.C., the U.S. International Trade Commission on December 29, 1977, instituted an investigation under section 201(b) of the Trade Act of 1974 to determine whether unwrought zinc, other than alloys of zinc, provided for in item 626.02 of the Tariff Schedules of the United States, is being imported into the United States in such increased quantities as to be substantial cause of serious injury, or the threat thereof, to the domestic industry producing an article like or directly competitive with the imported article.

Public hearing ordered. A public hearing in connection with this investigation will be held in Washington, D.C., at 10 a.m., E.S.T. on March 21, 1978, in the Hearing Room, U.S. International Trade Commission Building, 701 E Street, N.W. Requests for appearances at the hearing should be received in writing by the Secretary of the Commission at his office in Washington not later than noon, Monday, March 13, 1978.

There will be a prehearing conference in connection with this investigation which will be held in Washington, D.C., at 10:00 a.m., E.S.T. on Monday, March 13, 1978, in Room 117, U.S. International Trade Commission Building, 701 E Street, N.W.

Inspection of petition. The petition filed in this case is available for public inspection at the Office of the Secretary, U.S. International Trade Commission, and at the New York City office of the U.S. International Trade Commission located at 6 World Trade Center.

By order of the Commission:

KENNETH R. MASON
Secretary

ISSUED: December 30, 1977

APPENDIX B

STATISTICAL TABLES

Table 1.--Slab zinc: Production capacity, by selected countries,1973-77

(In thousands of short tons)

Country	1973	1974	1975	1976	1977
Japan	1,018	990	1,063	1,063	1,063
United States	781	769	723	709	709
Canada	639	614	621	701	701
W. Germany	506	478	478	478	478
Belguim	459	354	367	367	367
Australia	292	347	347	347	347
France	329	328	324	330	330
Italy	277	259	259	287	287
Spain	143	149	154	182	287
Mexico	118	173	217	217	217
Netherlands	166	154	165	165	187
Finland	99	99	165	165	165
Yugoslavia	90	127	127	127	127
Norway	93	94	94	99	99
United Kingdom	99	99	99	99	99
India	42	42	42	42	94
Peru	78	80	80	80	80
Zaire	77	77	77	77	77
Zambia	70	71	71	71	71
Brazil	21	39	39	53	66
Argentina	47	56	56	56	56
Austria	19	19	19	20	24
Total	5,463	5,418	5,587	5,735	5,931

Source: American Bureau of Metal Statistics, Inc. (1973) and Canadian Mineral Yearbook (1974-77).

Table 2.--Slab zinc: Production capacity, by selected countries, and by production process, 1973-76

(In thousands of short tons)

Country	1973		1974		1975		1976	
	E 1/	S 1/	E 1/	S 1/	E 1/	S 1/	E 1/	S 1/
Japan	589	429	680	429	695	418	695	593
Canada	639	0	626	0	700	0	700	0
West Germany	286	220	295	231	295	231	286	231
Belgium	257	202	257	248	257	235	268	235
France	110	219	110	215	110	240	121	274
Australia	218	74	221	75	281	75	281	75
Italy	200	77	205	77	205	77	205	77
Mexico	0	118	0	118	0	118	105	118
Spain	143	0	166	0	166	0	198	0
Netherlands	166	0	166	0	183	0	183	0
Finland	99	0	165	0	165	0	165	0
United Kingdom	99	0	99	0	99	0	99	0
Norway	93	0	93	0	93	0	93	0
Yugoslavia	68	22	68	22	68	22	68	22
Peru	78	0	78	0	78	0	78	0
Zaire	77	0	77	0	77	0	77	0
Zambia	34	36	34	36	34	33	34	42
India	42	0	42	0	39	0	74	0
Argentina	29	18	29	18	29	18	29	18
Brazil	21	0	21	0	21	0	21	0
Austria	19	0	19	0	19	0	19	0
Total	3,168	1,514	3,352	1,568	3,515	1,566	3,700	1,784

1/ E = electrolytic process; S=smelting process.

Source: American Bureau of Metal Statistics, Inc.

Table 3.--Slab zinc: Production, by selected countries, 1973-77

(In thousands of short tons)

Country	1973	1974	1975	1976	1977
Japan	926	937	769	818	858
United States	666	634	496	563	502
Canada	587	483	470	520	545
West Germany	435	441	325	336	374
Belgium	305	319	240	259	273
Australia	330	313	220	275	274
France	286	305	200	258	263
Italy	210	216	198	210	182
Spain	117	143	149	188	174
Mexico	81	151	169	193	194
Netherlands	34	86	128	135	120
Finland	88	100	121	122	152
Yugoslavia	61	86	98	100	109
Norway	89	79	67	69	78
United Kingdom	92	92	58	46	89
India	23	23	25	30	39
Peru	74	78	69	70	74
Zaire	75	76	73	66	54
Zambia	58	64	52	42	44
Brazil	25	34	35	47	46
Argentina	39	44	44	39	32
Austria	19	19	19	19	20
Total	4,620	4,723	4,025	4,405	4,496

Source: American Bureau of Metal Statistics, Inc. (1973) and International Lead-Zinc Study Group (1974-77).

Table 4.—Slab zinc: U.S. imports for consumption, by principal sources, 1973-77

Source	1973	1974	1975	1976	1977
	Quantity (1,000 short tons)				
Canada	345	278	182	313	240
West Germany	8	8	18	47	42
Belgium	39	30	17	35	41
Zaire	28	18	7	32	35
Finland	14	11	19	32	33
Mexico	2	26	14	58	32
Australia	41	39	23	33	29
All other	110	134	95	145	103
Total	587	544	375	695	555
	Value (1,000 dollars)				
Canada	148,225	184,095	134,015	223,125	160,224
West Germany	4,562	7,890	12,538	32,119	25,886
Belgium	20,789	31,253	14,417	23,211	23,986
Zaire	12,488	11,772	4,712	23,588	23,733
Finland	5,581	6,998	14,264	23,006	21,116
Mexico	732	21,982	10,083	39,421	20,418
Australia	18,892	29,903	17,295	23,549	19,612
All other	59,024	137,357	66,312	94,246	64,160
Total	270,293	431,250	273,636	482,265	359,135
	Unit value (cents per pound)				
Canada	21.4	33.1	36.8	35.6	33.3
West Germany	29.5	49.3	34.8	34.1	30.8
Belgium	26.6	52.0	42.4	33.1	29.2
Zaire	22.3	32.7	33.6	36.8	33.9
Finland	19.9	31.8	37.5	35.9	31.9
Mexico	18.3	42.2	36.0	33.9	31.9
Australia	23.0	38.3	37.5	35.6	33.8
All other	26.8	51.2	34.9	32.4	31.1
Total	23.0	39.6	36.4	34.6	32.3

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 5.--Slab zinc: U.S. imports for consumption, by countries, 1973-77

(In thousands of short tons)

Country	1973	1974	1975	1976	1977
Canada	345	278	182	313	240
W. Germany	8	8	18	47	42
Belgium	39	30	17	35	41
Zaire	28	18	7	32	35
Finland	14	11	19	32	33
Mexico	2	26	14	58	32
Australia	41	39	23	33	29
Spain	1/	2	29	30	23
Peru	19	31	19	20	21
France	11	4	2	9	19
Italy	0	8	6	29	18
Republic of South Africa	1/	1	2	4	6
Netherlands	3	5	15	8	5
Poland	13	9	1/	1	4
Yugoslavia	7	12	7	30	3
United Kingdom	8	5	2	2	2
Algeria	0	0	0	1	1
People's Republic of China	0	0	1/	3	1
Zambia	1/	0	0	3	1
Romania	0	0	0	7	0
Other	49	57	13	0	0
Total	587	544	375	695	555

1/ Less than 500 short tons.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Note.--Because of rounding, figures may not add to the totals shown.

Table 6.--Zinc: U.S. mine production and U.S. production of primary and secondary slab zinc, 1967-77

(In thousands of short tons)

Period	Mine production	Slab zinc production		
		Primary	Secondary	Total
1967	549	939	74	1,012
1968	529	1,021	80	1,101
1969	553	1,041	71	1,111
1970	534	878	77	955
1971	503	766	81	847
1972	478	633	74	707
1973	479	583	83	666
1974	500	555	79	634
1975	469	438	58	496
1976	485	499	64	563
1977 1/	463	450	52	502

1/ Estimated

Source: Compiled from official statistics of the U.S. Bureau of Mines.

Note.--Because of rounding, figures may not add to the totals shown.

Table 7.--Slab zinc: U.S. production of primary and secondary slab zinc, by grades, 1973-77 1/

(In thousands of short tons)

Grade	1973	1974	1975	1976	1977
Special high	276	277	242	234	159
High	26	17	19	31	32
Intermediate	38	23	13	21	13
Brass special	60	10	6	6	N.A.
Prime Western	267	307	216	268	230
Total	666	634	496	562	502

1/ Figures for 1977 are preliminary ABMS statistics except for the total.

Source: Compiled from official statistics of the U.S. Bureau of Mines.

Note.--Because of rounding, figures may not add to the totals shown.

Table 8.--Slab zinc: U.S. primary producers' productive capacity, by companies, 1973-77

(In thousands of short tons)

Company	1973	1974	1975	1976	1977
AMAX	81	70	84	84	84
ASARCO	153	153	122	108	108
Bunker Hill	109	109	104	104	104
National Zinc	53	53	56	56	56
New Jersey Zinc	120	120	118	118	118
St. Joe Zinc	215	215	180	180	180
Total	741	720	674	660	660

Source: Compiled from official statistics of the U.S. Bureau of Mines.

Note.--Capacities are prorated to account for plant closures during a given year.

Table 9.--Slab zinc: U.S. production capacity, 1/ 1967-77

Year	Production capacity	Ratio of production to capacity
1967	1,297	78
1968	1,347	82
1969	1,284	87
1970	1,177	81
1971	1,063	80
1972	849	83
1973	781	85
1974	769	82
1975	723	69
1976	709	79
1977	709	71

1/ Primary and secondary zinc capacity.

Source: Compiled from official statistics of the U.S. Bureau of Mines.

Table 10.--Slab zinc: U.S. producers' and importers' end-of-period inventories, by grades, 1973-75 and by quarters, 1976-77

(In short tons)

Period	Special High Grade		Other	
	Producers'	Importers'	Producers'	Importers'
1973	13,303	24,513	8,578	2,247
1974	7,876	20,112	18,447	1,222
1975	28,661	75,835	40,474	3,323
1976:				
January-March	28,367	52,570	34,849	10,261
April-June	15,902	60,816	36,263	10,281
July-September	29,619	53,711	31,774	10,276
October-December	47,665	91,360	57,526	16,615
1977:				
January-March	50,455	80,030	59,224	14,672
April-June	56,046	80,164	69,184	12,373
July-September	38,080	81,757	64,656	11,557
October-December	39,353	86,713	69,135	12,620

Source: Compiled from data submited in response to questionnaires of the U.S. International Trade Commission.

Table 11.--Man-hours worked by production and related workers in the manufacture of slab zinc, 1973-77

Year	Production and related workers producing--	
	All products	Slab zinc
1973	12,300	8,694
1974	11,643	8,072
1975	10,234	7,200
1976	10,211	6,970
1977	9,494	6,228

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 12.--Slab zinc: Average price quoted for Prime Western grade slab zinc, by quarters, 1973-77

(In cents per pound)

Period	U.S. market price	London Metal Exchange price	European producer price
1973:			
January-March	19.3	19.4	19.6
April-June	20.3	25.9	22.2
July-September	20.3	41.2	24.8
October-December	22.7	66.4	39.2
1974:			
January-March	31.9	67.5	31.5
April-June	34.8	74.4	35.9
July-September	37.8	46.4	35.8
October-December	39.3	36.1	38.0
1975:			
January-March	39.1	36.2	39.1
April-June	38.9	34.4	37.9
July-September	38.9	32.9	34.7
October-December	38.9	31.7	35.6
1976:			
January-March	37.0	31.8	36.1
April-June	37.0	34.9	36.1
July-September	37.0	33.6	36.1
October-December	37.0	28.4	36.1
1977:			
January-March	37.0	31.9	36.1
April-June	35.5	27.3	33.9
July-September	34.0	23.8	31.8
October-December	31.0	23.8	27.9

Source: Compiled from statistics of the American Bureau of Metal Statistics, the U.S. Bureau of Mines, and Metals Week.

APPENDIX C

PROBABLE ECONOMIC EFFECTS OF TARIFF CHANGES UNDER TITLE I AND TITLE V OF THE TRADE ACT OF 1974

IDENTIFICATION NUMBER:

60067

XII. Probable economic effects:

Article (brief description)	TSUS number(s)
Unalloyed wrought zinc	626.02 (5.1%)
Alloyed wrought zinc	626.04 (19.0%) P
Zinc waste and scrap	626.10 (4.9%)
Conditions of competition	

* * * * * * *

Library Cataloging Data

U.S. International Trade Commission.
Unalloyed, unwrought zinc. Report to the President on Investigation no. TA-201-31 under section 201 of the Trade act of 1974. Washington, 1978.

illus. 28 cm. (USITC Publication 894)

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