# AMMONIUM PARATUNGSTATE AND TUNGSTIC ACID FROM THE PEOPLE'S REPUBLIC OF CHINA

**Report to the President on Investigation No. TA-406-11 Under Section 406 of the Trade Act of 1974**

**USITC PUBLICATION 1982**

**JUNE 1987**

United States International Trade Commission / Washington, DC 20436

# UNITED STATES INTERNATIONAL TRADE COMMISSION

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Note:--Information that would reveal the confidential operations of individual concerns may not be published and therefore has been deleted from this report. Such deletions are indicated by asterisks.

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, DC

Investigation No. TA-406-11

AMMONIUM PARATUNGSTATE AND TUNGSTIC ACID
FROM THE PEOPLE'S REPUBLIC OF CHINA

Determination

On the basis of the information developed in the subject investigation, the Commission unanimously determines, with respect to imports of ammonium paratungstate and tungstic acid from the People's Republic of China, provided for in items 417.40 and 416.40, respectively, of the Tariff Schedules of the United States, that market disruption exists. 1/

Findings and recommendations

Commissioners Eckes, Lodwick, and Rohr find and recommend that in order to remedy the market disruption found with respect to imports of ammonium paratungstate and tungstic acid from the People's Republic of China, it is necessary to impose a quota restricting the combined volume of such imports for a 5-year period to the larger of 1.116 million pounds of tungsten content per year or 7.5 percent of U.S. consumption.

Chairman Liebeler finds and recommends, with the reservations set forth in her written views, that in order to remedy the market disruption found with respect to imports of ammonium paratungstate and tungstic acid from the People's Republic of China, it is necessary to impose a market share quota for a 5-year period restricting the combined volume of such imports to 17.2 percent of U.S. consumption.

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1/ Section 406(e)(2) of the Trade Act of 1974 defines such market disruption as existing whenever "imports of an article, like or directly competitive with an article produced by such domestic industry, are increasing rapidly, either absolutely or relatively, so as to be a significant cause of material injury, or threat thereof, to such domestic industry."

Vice Chairman Brunsdale finds and recommends, with the reservations set forth in her written views, that in order to remedy the market disruption found with respect to imports of ammonium paratungstate and tungstic acid from the People's Republic of China, it is necessary to impose a quota restricting the volume of such imports for a 5-year period to 2.114 million pounds of tungsten content per year with respect to ammonium paratungstate and 345,000 pounds of tungsten content per year with respect to imports of tungstic acid.

Background

This report is being furnished to the President pursuant to section 406(a)(3) of the Trade Act of 1974 (19 U.S.C. 2436(a)(3)) and is based on an investigation conducted under section 406(a)(1) of the act. The Commission instituted this investigation effective March 5, 1987, following receipt of a request from the United States Trade Representative.

Notice of the institution of the Commission's investigation and of a 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, DC, and by publishing the notice in the Federal Register of March 19, 1987 (52 F.R. 8654). A correction to the notice of institution was published in the Federal Register of April 8, 1987 (52 F.R. 11346). The hearing was held in Washington, DC, on April 29, 1987, and all persons who requested the opportunity were permitted to appear in person or by counsel.

VIEWS OF COMMISSIONERS ECKES, LODWICK AND ROHR

On the basis of the information developed in the course of this investigation, we determine that, with respect to imports of ammonium paratungstate (APT) and tungstic acid [1/] from the People's Republic of China (PRC), market disruption exists within the meaning of section 406 of the Trade Act of 1974. [2/] In order to remedy this situation, we find that it is necessary for the President to impose a market-share quota. [3/]

We base our determination on the rapid increase in these imports from the PRC since the PRC became eligible for most favored nation (MFN) treatment in

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1/ These imports are provided for in items 417.40 and 416.40, respectively, of the Tariff Schedules of the United States.

2/ 19 U.S.C. § 2436.

3/ Commissioner Eckes regrets that these views were prepared without knowledge or benefit of all his colleagues' views. Consequently, he is unable to provide the President and the public with a clear evaluation of the remedy recommendations proposed by the Chairman and Vice Chairman.

In a departure from longstanding Commission practice, they did not announce remedy positions in the Commission meeting convened for that express purpose. Their silence on a matter of considerable significance to parties in the United States and its trading partners seems contrary to the spirit of conducting government in the sunshine.

Also, when some Commissioners fail to make known their views to colleagues, it becomes increasingly difficult to fashion a majority Commission decision in accordance with the intent of Congress. In discussing § 201 remedy recommendations; which provide the analytical model for § 406, the

(Footnote continued on next page)

1980, the troubled financial state of the domestic industry, dramatically declining prices for APT in the domestic market, and evidence of consistent underselling by the Chinese imports, which have declined in price to an even greater extent than the domestic product. While domestic consumption of tungsten products has declined [4/] and has contributed to the material injury being suffered by the domestic industry, we find that the rapidly increasing imports from the PRC are a significant cause of that injury.

The statute defines market disruption as existing within a domestic industry——

> whenever imports of an article, like or directly competitive with an article produced by such domestic industry, are increasing rapidly, either absolutely or relatively, so as to be a significant cause of material injury, or threat thereof, to such domestic industry. [5/]

Thus, (1) the imports must be increasing rapidly, either absolutely or relatively, (2) a domestic industry producing a like or directly competitive

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(Footnote continued from previous page)
Senate Report emphasizes: ". . . the Committee feels strongly that the Commission ought to reach a clear, definitive majority view on the nature of the remedy that is most suitable to the injury found." S. Rep. No. 1298, 93d Cong., 2d Sess. 123 (1974) (emphasis added).

4/ Tungsten is used as a component of tungsten carbide, which provides hardness to drill bits and cutting edges in machine tools, and metal surfaces in forming and shaping dies and other wear resistant parts. Tungsten also is used in the filaments of light bulbs, and in other electrical applications, and in aircraft and armaments. Report at A-2—A-3 (describing other uses as well). The reduction in the demand for some of these products, as a result of such factors as the decline in energy exploration, and industrial and mining activities, has in turn reduced the demand for APT and tungstic acid. See Memorandum EC-K-219 (May 26, 1987) at 2.

5/ 19 U.S.C. § 2436(e)(2).

article must be materially injured or threatened with injury, and (3) such rapidly increasing imports must be a significant cause of the material injury or threat thereof. 6/

Domestic industry

The concept of domestic industry under section 406 is identical to that under section 201 of the Trade Act of 1974, and section 406(a)(2) specifically adopts the definition of industry set forth under section 201(b)(3). 7/ According to that section, the Commission is to define the domestic industry as that industry producing an article "like or directly competitive" with the imported article. The Report of the Senate Committee on Finance stated that

> "Like" articles are those which are substantially identical in inherent or intrinsic characteristics (i.e., materials from which made, appearance, quality, texture, etc.) and "directly competitive" articles are those which, although not substantially identical in their inherent or intrinsic characteristics, are substantially equivalent for commercial purposes, that is, are adapted to the same uses and are essentially interchangeable therefor. 8/

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6/ See, e.g., Ferrosilicon from the Union of Soviet Socialist Republics, Inv. No. TA-406-10, USITC Pub. 1484 (Feb. 1984) at 3, 21.

7/ 19 U.S.C. § 2436(a)(2), incorporating 19 U.S.C. § 2251(b)(3) by reference.

8/ S. Rep. No. 1298, 93d Cong., 2d Sess 122 (1974).

The imports subject to investigation, [9/] APT and tungstic acid, [10/] are intermediate products in the processing of tungsten ore and concentrate into tungsten powders. [11/] Tungstic acid may be produced at two different places in this process, either in the initial processing of ore concentrate, where a crude sodium tungstate or tungstic acid is produced, or after the next processing step in which either APT or a further refined version of tungstic acid is produced. [12/] The first form of tungstic acid is the only form of tungstic acid produced in significant quantities in the United States during

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9/ Commissioner Rohr notes that in this investigation, he has treated the two chemical forms in which tungsten has been imported from the PRC as a single article, or, alternatively, as a single class of articles. The Commission must implicitly or explicitly analyze the nature of the imports whose impact on the domestic industry it is required to assess. The issue affects not only the definition of the domestic industry but also the analysis of causation, because the Commission must determine whether it will assess the impact of a single monolithic group of imports on the industry or industries or the impact of discrete multiple groups of imports. He notes that most frequently the Commission has not treated slightly different forms of imports as distinct articles. For example, in Unwrought Copper, Inv. No. TA-201-52, USITC Pub. 1549 (July 1984), the scope of investigation covered, in addition to unwrought (refined) copper, several less refined intermediate upstream products, including blister copper. In that investigation the Commission determined there was a single industry and a single imported "article." A similar result is appropriate in this investigation. APT and tungstic acid will thus be viewed as a single "article" for the purpose of considering whether market disruption exists.

10/ "[I]mports of ammonium paratungstate and tungstic acid from the People's Republic of China, provided for in items 417.40 and 416.40, respectively, of the Tariff Schedules of the United States," 52 Fed. Reg. 8654 (March 19, 1987), as corrected in 52 Fed. Reg. 11346 (April 8, 1987), constitutes the scope of the Commission's investigation, instituted pursuant to the request of the USTR by letter dated February 26, 1987. See 19 U.S.C. § 2436(a)(1).

11/ Report at A-2—A-6.

12/ Report at A-4.

the period of investigation, 13/ and was captively consumed and converted into APT by its producer. 14/ This producer did not maintain separate data on production of this crude form of tungstic acid. 15/

The tungstic acid imported from the PRC was of a substantially more refined form than that which was produced in the United States. 16/ Both APT and the more refined form of tungstic acid are technically interchangeable for their primary use: the manufacture of tungsten metal and tungsten carbide powders. 17/ However, both forms of tungstic acid are used as a feedstock for the production of APT and then tungsten powders. 18/

Due to the fact that (1) tungstic acid, where produced in the United States, is produced in any significant quantity only by a producer of APT, (2) the bulk of the U.S. produced tungstic acid is captively utilized in the domestic production of APT and then tungsten metal or tungsten carbide powder,

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13/ The Commission sought data for the years 1982 through 1986 as its period of investigation.

14/ Report at A-3; A-4; A-8---A-9.

15/ Report at A-9, A-12, A-13, A-37, n. 1.

16/ Report at A-4, n.2.

17/ Transcript of April 29, 1987 Hearing (Tr.) at 54-56 (tungstic acid and APT can be interchangeably used by consumers), 69 (the major use for both tungstic acid and APT is to manufacture tungsten powder and tungsten carbide); Report at A-2---A-6.

18/ The refined form of tungstic acid is converted to APT before being converted to tungstic oxide because purity of the oxide subsequently produced is greater than if the tungstic acid were directly converted into tungstic oxide.

and is not sold commercially in the marketplace, [19/] and (3) separate data on domestic tungstic acid (for example, financial data, production, domestic consumption, and prices) generally are not available, we find that one domestic industry exists producing articles like or directly competitive with the imported articles, which consists of the domestic facilities producing APT and tungstic acid.

Rapidly increasing imports

The statute, at section 406(e)(2), [20/] requires imports to be increasing rapidly, "either absolutely or relatively." The Report of the Senate Finance Committee states that the increase in imports "must have occurred during a recent period of time, as determined by the Commission taking into account any historical trade levels which may have existed." [21/] Volumes of tungsten intermediate products such as APT and tungstic acid are frequently measured in terms of tungsten content. We will generally refer to pounds of tungsten content (lbs W) ("W" is the chemical abbreviation for tungsten) to quantify such data as import volume, production, or shipments.

The PRC did not export APT or tungstic acid to the United States before 1980, the year in which the PRC became eligible for MFN treatment (and the

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19/ Report at A-2, A-4, n.2, A-8--A-9.

20/ 19 U.S.C. § 2436(e)(2).

21/ S. Rep. No. 1298 at 212.

dramatically lower column 1 tariff rates). [22/] In 1980, imports of APT and tungstic acid from the PRC were still negligible. Imports then rose to 743,000 lbs W in 1981, [23/] and 941,000 lbs W in 1982, before falling by 59 percent to 385,000 lbs W in 1983. Subsequently, import levels rose four-fold to 2.0 million lbs W in 1984, and further increased by 40 percent to 2.8 million pounds W in 1985 before declining to 2.5 million lbs W in 1986. The 1986 level was still far above the import levels of the early 1980's, and 22 percent above the import volume of 1984. Comparing the first quarters of 1986 and 1987, combined imports of APT and tungstic acid increased from 470,000 lbs W to 1.1 million lbs W. [24/]

Imports of APT and tungstic acid have also increased rapidly as a percentage of consumption, [25/] rising from 3.1 percent in 1983 to 10.4 percent in 1984 and to 16.2 percent in 1985. Import penetration further increased, despite a decline in volume, to 17.2 percent in 1986. [26/] Thus, imports of APT and tungstic acid from the PRC have substantially increased

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22/ Prior to obtaining MFN status, the column 2 rates of duty applicable to imports of APT and tungstic acid from the PRC were 49.5 percent and 55 percent ad valorem, respectively. The column 1 rates that have been applied to imports of these products from the PRC since that time have declined to 10.0 and 10.5 percent, respectively. See Report at A-8.

23/ Commissioner Rohr notes that imports of tungsten ore concentrate from the PRC were substantial at this time, totalling 2.0 million lbs W in 1980 and 2.5 million lbs W in 1981, and the volume of these imports declined as the volume of APT and tungstic acid increased during the period of investigation. See Report at A-27.

24/ Report at A-30—A-31.

25/ We note that because virtually all domestically produced or imported tungstic acid is converted into APT, consumption of APT subsumes the consumption of tungstic acid.

26/ Report at A-29; A-13.

their market share over 1984 levels at a time of significantly declining domestic consumption. 27/ We therefore find that imports of APT and tungstic acid from the PRC have been increasing rapidly.

Material injury

Section 406 also requires that in order for market disruption to exist, the domestic industry must be materially injured or threatened with material injury. The statute and legislative history do not give any specific guidance on what factors are to be considered in determining whether "material injury" exists. 28/ The Commission generally has examined the types of factors it considers in investigations under section 201. 29/

We find the domestic industry is materially injured. 30/ Indicative of this material injury, the industry operated unprofitably and with generally

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27/ Report at A-13.

28/ Material injury does represent a lesser degree of injury than the requirement that an industry be "seriously injured" under section 201 of the Trade Act of 1974. E.g., S. Rep. No. 1298, 93d Cong., 2d Sess. at 212 (1974).

29/ See, e.g., Ferrosilicon at 9, n.23. Those factors include all economic factors the Commission considers relevant, including the significant idling of productive facilities in the industry (including the closing of plants or the underutilization of production capacity), the inability of a significant number of firms to operate at a reasonable level of profit, and significant unemployment or underemployment within the industry. 19 U.S.C. § 2251(b)(2)(A).

30/ The Commission traditionally has followed a "pyramid" approach in defining an industry and has included in the industry all domestic productive facilities, or portions thereof, involved in the production of the domestic article, including those upstream from the domestic article. See, e.g., Unwrought Copper, Inv. No. TA-201-52, USITC Pub. 1549 (July 1984) at 7-8, 24, 54. Thus, the mining and processing facilities engaged in producing tungsten ore and concentrates are part of the domestic industry producing APT and tungstic acid. However, we have focused on domestic data relating to APT and tungstic acid production, in view of the fact that (1) the mining facilities are presently shut down, Report at A-9—A-10, and it is unclear what other upstream facilities are operational, (2) other ores were produced at the mining facilities producing tungsten ores and we were unable to allocate data

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low levels of capacity utilization, with recurring plant closings and declining employment throughout 1982-1986. Even more significantly, a number of industry indicators have sharply declined since the peak consumption year of 1984, with one producer filing for bankruptcy in 1985. We find the decline of the industry after 1984 to be particularly pertinent to our analysis of the condition of the industry, as this was when the greatest volume of imports began entering the United States.

Apparent consumption fluctuated considerably between 1982 and 1986. After remaining at very low levels of 12.9 million lbs W in 1982 and 12.5 million lbs W in 1983, apparent consumption rose dramatically, to 19.4 million lbs W in 1984. It then declined to 17.5 million lbs W in 1985, and further fell to 14.3 million lbs W in 1986. 31/ It is significant that a number of industry indicators declined more steeply than consumption in 1984-1986.

U.S. production of APT 32/ rose from 10.5 million lbs W in 1982 to 12.0 million lbs W in 1983, and further increased by 62 percent to 19.4 million lbs W in 1984. Production then declined by 21 percent to 15.2 million lbs W in 1985 and further fell by 24 percent to 11.5 million lbs W in 1986.

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among the different ores produced, and (3) in view of the fact that mining and refining operations are largely shut down, it appears that any data reflecting the operations of these facilities would only further reinforce our finding that the domestic industry is materially injured. Further, conversion of concentrate into APT is a substantial operation in terms of value added, and non-integrated producers that do not mine ore or produce ore concentrate account for a substantial portion of APT production.
Commissioner Rohr does not join this footnote.

31/ Report at A-13.

32/ Virtually all U.S.-produced tungstic acid was captively consumed in the production of APT and tungsten powders; thus, there are no separately available data on tungstic acid production. Therefore, our discussion will focus on APT production data.

Thus, while production levels have risen from 1982 to 1986, they have declined significantly from their peak in 1984. 33/ Capacity utilization for the industry followed the trends in production, rising from 42.8 percent in 1982 to 46.3 percent in 1983 and to 77.4 percent in 1984 before declining to 59.3 percent in 1985 and further falling to 45.6 percent in 1986. 34/ Total shipments exhibited a similar trend, although shipments declined by 12 percent from 1982 to 1983 (from 8.4 million lbs W to 7.4 million lbs W) before more than doubling to their peak of 15.1 million lbs W in 1984. Total shipments subsequently declined by 18 percent in 1985 (to 12.3 million lbs W) and by 21 percent in 1986 (to 9.8 million lbs W). 35/

Employment in the industry declined sharply by 31 percent during the period of investigation, from 195 production and related workers in 1982 to 135 production and related workers in 1986. Hours worked exhibited a marginal increase from 1982 to 1984, then declined significantly from 1984 to 1985 and again in 1986. 36/ Two producers reported laying off or terminating

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33/ Report at A-14. This information was obtained from responses to Commission questionnaires. Publicly available data from government statistics demonstrate a similar trend, although the questionnaire data show a more pronounced change from year to year. Id.

34/ Report at A-13.

35/ Report at A-14—A-15.

36/ Report at A-16—A-17.

employees during the period of investigation, while a third shut down APT production on several occasions. 37/

Financial data on APT operations of the domestic industry further demonstrate that the industry is experiencing material injury. One U.S. producer filed for bankruptcy in mid-1985. 38/ Questionnaire data indicate that between 1984 and 1986, net sales declined by 57 percent from their 1984 peak. The domestic industry suffered operating losses throughout 1982-86, though exhibiting decreased losses in 1984. Since 1984, however, operating losses have worsened, by 23.1 percent, in 1985 and further worsened by 10.7 percent in 1986. 39/ While there was thus some improvement in the condition of the industry in 1984 when net sales and consumption peaked, it has since declined even from that dismal level. 40/

Significant cause

The term "significant cause" is intended to represent a lesser standard of causation than the "substantial cause" requirement of section 201, but a more direct causal relationship than the "contribute importantly" requirement imposed in the adjustment assistance provisions of the Trade Act of 1974. 41/ As "substantial cause" under section 201 is defined as being "a

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37/ Report at A-17.

38/ Report at A-9.

39/ Report at A-18.

40/ Commissioner Lodwick notes that the industry also suffered gross losses throughout 1982-86. While there was improvement in 1984 when net sales and consumption peaked, gross losses and gross loss margins were at their worst levels in 1986. Report at A-18.

41/ S. Rep. No. 1298 at 212.

cause which is important and not less than any other cause," 42/ a "significant cause" under section 406 thus means at least an important cause of material injury, but not necessarily the only cause or a cause that is equal to or greater than other causes. 43/

We find that the rapidly increasing imports of APT and tungstic acid from the PRC are a significant cause of the material injury suffered by the domestic industry. The imports from the PRC have increased from virtually nothing in 1980 to 2.5 million lbs W in 1986. 44/ Market penetration has steadily increased from 3.2 percent of domestic consumption in 1983 to 10.4 percent in 1984, 16.2 percent in 1985, and further rising to 17.2 percent in 1986. 45/ The imports have significantly increased market share from 1984 through 1986 at a time of declining consumption, and increasing operating losses.

We also find that the imports from the PRC have had a negative effect on prices in the U.S. market. Domestic prices for APT plummeted from mid-1984 to

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42/ 19 U.S.C. § 2251(b)(4).

43/ See Ferrosilicon at 11, 33.

44/ Report at A-29, A-31. We note the slight decline in import volume in 1986 still left the volume of imports at a significantly higher level than in 1984. Moreover, the decline in import volume from 1985 to 1986 may have been due in part to the consultations that were then on-going between the PRC and the United States with respect to the section 406 petition that had been filed with USTR by the Refractory Metals Association in December, 1985. See Report at A-1.

45/ Report at A-21; A-13.

the end of 1986. [46/] Declining demand for downstream tungsten products and declining prices for the raw material, tungsten ore concentrate, [47/] have had a role in this decline. However, we note that prices for the imported APT from the PRC, as reported by purchasers, have declined by 71 percent more than have domestic prices since mid-1984. [48/] Further, the imports of APT [49/] from the PRC have consistently undersold the domestic product. [50/] We find the more rapid decline in PRC prices and the consistent underselling by the imports to be particularly significant because they occurred at a time of declining domestic consumption and during a time in which the imports increased in market share and volume.

Moreover, we note that the ratio of the cost of goods sold to net sales by the domestic industry has increased steadily since 1984, suggesting that prices were being depressed relative to costs, even while the raw material component of those costs was declining. [51/] Accordingly, while the decline in concentrate prices had a role in the decline in domestic prices for APT, these data suggest that additional significant factors were also having a

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46/ Report at A-39.

47/ Report at A-36--A-37; Table 19.

48/ Report at A-41.

49/ We refer only to underselling of APT, because it is the only U.S.-produced product sold commercially. Report at A-37, n. 1.

50/ Report at A-41.

51/ See Report at A-18.

depressing effect on prices. We find that the rapidly increasing imports from the PRC, which were being sold at declining prices and at prices consistently below the prices for the domestic product, had such a role in depressing domestic prices. 52/

Conclusion

For the reasons set forth above, we have concluded that imports of APT and tungstic acid from the PRC have disrupted the U.S. market for those products.

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52/ Commissioner Eckes notes that Congress expressed concern about the possibility of the United States becoming dependent on Communist countries for vital raw materials. See S. Rep. No. 1298 at 210. Tungsten products have important national defense applications in the production of alloys and armor-piercing projectiles, and in the broader sense, for machining and machine tools essential for military preparedness. Tr. at 45-52. In recent years, depleted uranium has been used for some defense uses in place of tungsten. However, testimony suggests that for such uses there is a definite shift back toward tungsten for cost considerations. Tr. at 47. Also, there is some indication that there may be some performance problems with depleted uranium, particularly when used in close proximity to personnel because of possible residual radioactive effects. Tr. at 49.

Further, Congress' concern about dependence on Communist countries for vital raw materials should be extended to products, such as APT and tungstic acid, which are processed from vital raw materials, such as tungsten ore and ore concentrate. Domestic deposits of ores, or ore stockpiles may in some circumstances limit dependence on foreign resources; however, the effectiveness of these is contingent upon the existence of the ability to further process these strategic raw materials domestically. Tr. at 47, 50-51. See Ferrosilicon at 24-25.

Remedy

In order to remedy the market disruption we have found to exist, we find that it is necessary for the President to impose quantitative restrictions in the form of a market share quota on imports of ammonium paratungstate and tungstic acid from the People's Republic of China, provided for in items 417.40 and 416.40, respectively, of the Tariff Schedules of the United States for a 5-year period. We find that a quota restricting the combined volume of these imports to a market share of 7.5 percent for 5 years will remedy the market disruption we have found to exist. 53/ However, we recommend that such quotas provide for the entry of at least 1.116 million lbs W of APT and tungstic acid per year from the PRC, which is the average level of such imports that entered during 1982-84, the period that we find is the most recent period "representative" of imports within the meaning of section 203(d)(2) of the Trade Act, to the extent that such a period exists. 54/

Generally, relief in the form of tariffs is preferred over relief in the form of quotas, since quotas tend to have a more distortive effect on trade. However, we are recommending quotas in this case because we found it difficult

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53/ This quota would be calculated by finding the ratio of imports of APT and tungstic acid from the PRC to consumption of those products in the United States. Consumption would be defined as APT consumption because virtually all tungstic acid produced or imported into this country is converted into APT.

54/ Historically, the PRC has not been a significant supplier of APT or tungstic acid to the U.S. market. Imports of APT did not begin to be imported in any significant quantity until 1981, and imports of tungstic acid did not begin until 1984. Report at A-29 (Table 15); A-31. Arguably, there is no recent period that is truly "representative" of imports of such articles. However, to the extent that such a period exists, we suggest the period 1982-84, which would be the 3-year period prior to the period when material injury from PRC imports was most apparent.

to predict how much of a tariff increase the PRC is likely to absorb. In prior cases, the Commission has noted concern that, at least with respect to particular products, the PRC may have an ability to absorb increases in tariffs. 55/ Accordingly, we feel that a quota is a more effective remedy in this case. 56/

We have recommended a market rate quota instead of a quota based only on import volume because of the wide fluctation in demand for the products under investigation. Consumption rose until the early 1980's, declined in 1982 and 1983, rose dramatically in 1984, and then further decreased in 1985 and 1986. 57/ It is unclear whether demand over the next 5 years will expand or contract. If demand sharply decreases, a quota based on volume would be unlikely to be sufficient to remedy market disruption, as the relative market share of the domestic industry would likely decline. On the other hand, if demand sharply increased, the market share of the imports might be restricted to a degree greater than that necessary to remedy the market disruption. Accordingly, a market share quota is the best available remedy for the market disruption we have found to exist.

A market share of 7.5 percent is based on the average market share of the imports from the PRC during 1982-84. 58/ We have excluded 1985 and 1986 and

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55/ See Canned Mushrooms from the People's Republic of China, Inv. No. TA-406-9, USITC Pub. 1293 (September 1982) at 19 (Commissioners Frank, Haggart).

56/ We note that a market share quota of 7.5 percent of consumption was the remedy requested by the domestic industry in this case. See Refractory Metals Association Post-hearing Brief at 9-10.

57/ Report at A-12—A-13; Table 1.

58/ The statute directs that any quotas imposed shall permit the importation of a quantity or value of the article which is not less than the quantity or value of such article imported during the most recent period which the President determines is representative of imports of such article. 19 U.S.C. § 2253(d)(2).

have concluded that they are not representative because it was during those years that imports reached their peak while the condition of the industry declined. 59/

In order to permit the importation of a quantity of the articles which is not less than the quantity imported during the most recent representative period, we recommend that imports of 1.116 million lbs W be permitted, regardless of the market share obtained by the imports. This figure is the average of the import volume of these products from the PRC during 1982-84. For example, if demand declined to 12 or 13 million lbs W, levels equal to or less than the demand levels in the years 1982 and 1983, 60/ the market share for the imports from the PRC would range between 8.6 percent if consumption declined to 13 million lbs W, and 9.3 percent if consumption declined to 12 million lbs W. 61/

At this time we recommend no phased reduction of the proposed relief over the five-year period. Current and projected near-term demand are too weak for

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59/ Cf. S. Rep. No. 1298, 93d Cong., 2d Sess. (1974) at 126 (under section 203(d), the requirement that import levels should not be restricted below that level achieved during a representative period "should not be construed to mean that there could not be any cut-back in imports from the level existing when injury is found to exist.").

60/ See Report at A-13, Table 1.

61/ See Report at Table 15, Table 1.

any such phased reduction to be effective. Due to weak demand, had our recommended market share quota been in place in 1986, the required floor amount would have been operative, and thus imports could have exceeded the market share quota. Industry estimates available to the Commission project that demand in 1987 will be lower than in 1986, and 1988 demand is likely to be less than or roughly comparable to 1986 levels. However, we acknowledge the desirability of phasing down relief over time when practical, and recommend that, in this instance, such reductions be considered if future conditions warrant. 62/

Information presented to the Commission during this investigation suggests that circumvention of relief may be possible by shifting exports to certain downstream tungsten products, such as tungsten oxides, to which the relief in this case would not extend. 63/ We recommend that the President

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62/ Commissioner Rohr concurs with his colleagues that the provision of a phased reduction of relief with respect to tungstic acid and APT is not appropriate for the reasons stated above. He believes that there is an additional reason in the virtual certainty of circumvention of any relief imposed on imports of tungstic acid and APT. See note 63, infra. The inexorable development of the import pattern of tungsten products from the PRC is towards increasingly processed products. Our relief will substantially increase the incentive to move to these products. To lessen the restriction on the less advanced products after, for example, three years is unlikely to cause the PRC to abandon the move towards more advanced, and profitable, products to less advanced ones. To provide a phase reduction of relief is therefore unlikely to have any real effect and he cannot therefore recommend it.

63/ Commissioner Rohr notes that the information before the Commission does much more than suggest that it may be possible to circumvent any relief proposed herein. He believes that the evidence demonstrates that such

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closely monitor import levels of downstream tungsten products to ascertain whether such circumvention is taking place, and further recommend that the President be prepared to take such action as may be authorized by section 406(c), 19 U.S.C. § 2436(c), or any other provision of law, to deal with any such circumvention. We also recommend that the President monitor imports of APT and tungstic acid to ensure that circumvention of this remedy is not taking place via transshipments of exports from third countries. We note that information obtained in this investigation suggests that import volumes from the PRC may have been understated because of transshipments of exports from the PRC through Hong Kong. 64/

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circumvention is virtually certain. Tungsten ore goes through a plurality of processing steps, each resulting in a distinct product form, before it is finally used to create an end product. These include, for example, ore, concentrate, tungstic acid, APT, tungstic oxide, and tungsten carbide. Each step involves the addition of at least some "value added" through more or less complicated and expensive production processes. The intermediate forms of tungstic acid, APT, and oxide appear to involve relatively small amounts of value added and relatively simple and inexpensive processes.

In this context, it is important to note the pattern of imports from the PRC. Initially, the principal form of exports by the PRC to the United States was tungsten ore concentrate. Over time this changed to the point where the principal exports to the United States are now tungstic acid and APT. There are now already minimal amounts of tungstic oxide. The natural development of this pattern suggests that upgrading exports to tungstic oxide and eventually to other downstream products (such as tungsten metal powder or tungsten carbide powder) should be expected. While conversion to tungsten metal or tungsten carbide powders is relatively sophisticated and it is likely to be some time before exports could be upgraded to these products, the conversion to oxide is relatively easy. In such circumstances, a shift in PRC exports to the United States to tungstic oxide, which is outside the scope of the Commission's investigation as requested by USTR and the industry and thus must remain outside the scope of our recommended remedy, must be expected. The imposition of import limitations on tungstic acid and APT provide extra and immediate incentives to shift exports to tungstic oxide.

64/ See Transcript of April 29, 1987 hearing at 158-160.

VIEWS OF CHAIRMAN SUSAN LIEBELER AND
VICE CHAIRMAN ANNE E. BRUNSDALE

Ammonium Paratungstate and Tungstic Acid
From the People's Republic of China

Investigation TA-406-11

June 5, 1987

We determine that market disruption exists within the meaning of section 406 of the Trade Act of 1974 with respect to imports of ammonium paratungstate (APT) and tungstic acid[1] from the People's Republic of China (PRC).[2] We concur with the discussions of Commissioners Eckes, Lodwick, and Rohr on the definition of the domestic industry and the issue of rapidly increasing imports. Here, in addition to discussing the condition of the industry, causation, and threat, we provide separate views

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[1] These imports are provided for in items 417.40 and 416.40, respectively, of the Tariff Schedules of the United States.

[2] 19 U.S.C. §2436.

on remedy.

Condition of the Industry

Section 406 requires that, in order for market disruption to exist, the domestic industry must be materially injured or threatened with material injury. The statute and legislative history do not provide specific guidance on the factors to be considered in determining material injury. It is clear, however, that "material injury" in section 406 is a lesser injury than "serious injury" in section 201.[3]

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[3] 1974 U.S. Code Cong. & Adm. News, p. 7344. The term "material injury" is also present in title VII, which deals with allegations of dumping and subsidization. However, the market disruption statute was enacted in 1974, while the word "material" was not added to title VII until 1979. Although in section 406 cases Commissioners have sometimes referred to the title VII standard, (See, e.g., Anhydrous Ammonia from the U.S.S.R., Inv. No. TA-406-5, USITC Pub. 1006, at 24 (Statement of Reasons for the Determination of Commissioners Paula Stern and Bill Alberger)). Commission precedent on the proper definition of material injury in section 406 context is unclear. Thus, neither the statute, the legislative history, nor Commission precedent provide specific guidance as to what material injury means. Because the evidence on the condition of the domestic industry in this case reflects substantial harm to the domestic industry, we find it

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U.S. apparent consumption of ammonium paratungstate (APT) moved irregularly over the 1982-86 period, finishing 10 percent above its 1982 level. Specifically, consumption (measured in millions of pounds of tungsten content)[4] fell from 12.9 in 1982 to 12.5 in 1983, before rising to 19.4 in 1984, and then falling back to 17.5 in 1985 and 14.3 in 1986. Production[5] and shipments of APT followed a similar pattern, although the magnitudes of the changes varied greatly.[6][7]

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unnecessary to decide what constitutes the threshold for material injury under section 406 at this time. We reserve judgment on whether material injury under section 406 is identical to material injury under Title VII.

4 Report at 13, Table 1. All quantity measurements will be in millions of pounds of tungsten content unless otherwise specified.

5 Virtually all U.S.-produced tungstic acid was captively consumed by producers of APT and other downstream products. Hence, no data are available on production of tungstic acid alone. Therefore, this discussion is concerned with production data for APT.

6 Production of APT increased from 10.5 million pounds in 1982 to 12.0 in 1983 and 19.4 in 1984. Thereafter it decreased to 15.2 in 1985 and 11.5 in 1986. Report at A-13, Table 2.

7 U.S. producers' shipments for sale or internal consumption and excluding toll conversions increased 16 percent by volume over the period of investigation. They fell 12 percent from 8.4 million pounds of tungsten content in 1982 to 7.4 in 1983, then more than doubled to 15.1 million pounds in 1984 before falling to 12.3 in 1985, to 9.7 in 1986. Report at A-15, Table 3. The value of shipments followed similar trends, though the magnitudes of the upward and downward movements were different. Id.

Year-end inventories (including consumer and producer stocks) decreased 36 percent over the 1982-1986 period. They rose from 1.6 millions of pounds in 1982 to 2.1 in 1983 and 2.6 in 1984, before falling to 2.3 in 1985 and 1.0 in 1986.[8] U.S producers' year-end inventories behaved in much the same way.[9]

U.S. capacity to produce APT was fairly constant over the 1982-1986 period.[10] Consequently, capacity utilization followed the same up and down pattern as production.[11]

Hours worked and total compensation also followed the same pattern, but industry employment declined over the

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8 Report at A-13, Table 1.

9 U.S. producers' inventories rose from 2.1 in 1982 to 3.0 in 1983 and 3.3 in 1984, and then fell to 2.8 in 1985 and 1986. Report at A-16, Table 4.

10 Capacity (in millions of pounds of tungsten) increased 2.8 percent over the period, rising from 24.6 in 1982 to 25.8 in 1983, falling to 25.0 in 1984, recovering to 25.7 in 1985 and falling to 25.3 in 1986. Report at A-15, Table 2.

11 Capacity utilization increased from 42.8 percent in

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entire period.[12] Hourly wages and total hourly compensation rose steadily from 1982 through 1986, with overall increases of 20 and 19 percent respectively.[13]

Productivity rose from 1982 through 1984, fell slightly in 1985, and remained stable in 1986.[14] Two producers reported layoffs or terminations during the period, while another shut down its APT operations altogether on several occasions.[15]

Most of the production indicia declined through 1985 and 1986. However, on balance, conditions in 1985-1986

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1982 to 46.3 percent in 1983 and 77.4 percent in 1984 and, thereafter, fell to 59.3 percent in 1985 and 45.6 percent in 1986. Id.

12 Employment in the domestic APT industry declined 31 percent over the period of investigation, from 195 workers in 1982 to 194 in 1983, 193 in 1984, 178 in 1985 and 135 in 1986. Report at A-16, Table 5. Hours worked by such workers declined, though they rose between 1982 and 1984. Wages rose from $3.6 million in 1982 to $3.8 million in 1983 and $4.1 million in 1984, before declining to $3.7 million in 1985 and $2.9 million in 1986. Id. Total compensation paid followed a similar trend. Id.

13 Id.

14 Id.

15 Report at A-17.

were similar to conditions in 1982-1984.

The Commission obtained income and loss data from producers representing [ * * * ] of total domestic production of APT.[16] According to those data, total net sales by value decreased by 18.3 percent from 1982 to 1983, rose by 74.4 percent from 1983 to 1984, then declined by 17.1 percent from 1984 to 1985 and a further 48.1 percent from 1985 to 1986. The total decline from the 1984 peak was 57 percent.[17] The industry experienced both gross and operating losses throughout the 1982-1986 period.[18] Operating losses increased by 5.6 percent from 1982 to 1983, decreased by 48 percent from 1983 to 1984, increased by 23.1 percent from 1984 to 1985 and increased again by 10.7 percent from 1985 to 1986.[19] Gross losses followed the same pattern.[20]

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[16] The vast majority of domestic production is accounted for by questionnaire respondents. The actual percentage accounted for is confidential.

[17] Report at A-18, Table 6.

[18] Id. [ * * * ] Report at A-19, Table 7. [ * * * ]. Report at A-18, Table 6.

[19] Id.

[20] Gross losses (in millions of dollars) increased from 16.4 percent of sales in 1982 to 22.6 percent of sales in 1983, then fell to 3.3 percent of sales in 1984 before rising to 10.6 percent of sales in 1985 and 33.8 percent of sales in 1986. Id.

We conclude that the trends in consumption, production, shipments, capacity utilization, employment, and gross and operating profits indicate that the industry is materially injured.

Causation Analysis

A. General Approach

Market disruption exists in this case if rapidly increasing imports of APT and tungstic acid from China are a significant cause of material injury, or threat thereof, to the domestic industry.[21] "Significant cause" denotes a lesser standard of causation than the "substantial cause" requirement of section 201 of the Trade Act of 1974,[22] but a more direct causal relationship than the "contribute importantly" standard in the adjustment assistance provisions of the Trade Act of 1974.[23]

"Substantial cause" is defined as a cause "which is

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21 19 U.S.C. § 2436(e)(2).

22 19 U.S.C. § 2251.

23 S. Rep. No. 1298 at 212.

important and not less than any other cause."[24] Thus, section 201 contemplates that the various causes will be weighed against one another. Section 406, with its use of the "significant cause" standard, also mandates that causes be weighed, for a cause can only be significant in contrast to another cause or the "total" cause.

Our approach to analyzing causation in all cases is guided by the principle that it is imperative to be able to distinguish between cause and effect.[25] In this case we use a framework that makes it possible to distinguish situations where "increased imports" from a particular

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[24] 19 U.S.C. 2251(b)(4).

[25] For example, the fact that the quantity of Chinese imports has increased and that the domestic industry is injured does not necessarily mean that those imports are a cause of injury, much less a significant cause of injury or threat of injury. The coincidence of increases in Chinese imports and injury to the domestic industry may be due entirely to changes in other factors. For example, an increase in the domestic industry's costs could cause a reduction in domestic production and an increase in domestic price that could attract increased imports from China as well as from other countries. Injury to the domestic industry would be caused by these higher costs, not by the increase in imports; that is, the increase in imports would be an effect rather than a cause of the injury.

country are a significant cause of material injury or threat thereof from situations where the increase in those imports is merely an effect of changes in other factors operating in the domestic market.

This framework is similar to the one we use in our causation analysis in section 201 investigations. However, it differs in that it must assess the effect of import supply from one particular country on the domestic industry as opposed to the effects of imports from all countries. The appropriate framework for this section 406 investigation (which involves a world market) has four general components: (1) the domestic demand for the product, (2) the domestic supply of U.S. producers, (3) import supply of all foreign producers, and (4) the import supply from the country under investigation (in this case, China). Each component incorporates the influence of (or depends on) a different collection of specific variables. Indeed, this framework is especially useful because it enables us to consider the influence of any particular variable deemed relevant to the study of a market.

For example, variables such as consumer tastes, oil exploration activity, and prices of substitute products

(like ceramic products) each influence the domestic demand for APT and tungstic acid. Domestic supply and import supply each depend on different sets of variables.

As in section 201, for any given period, domestic demand, domestic supply, and total import supply determine the price observed in the market as well as the quantity sold by all domestic firms and the the total quantity of imports. However, in section 406, we must examine the effect of Chinese imports on total import supply in the United States. Furthermore, and of central importance to causation analysis, changes over time in the domestic price, in the quantity of domestic shipments, or in the quantity of imports can be traced to changes in one or more of these basic components.[26]

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[26] A change in a component, such as an increase in import supply, means that there is a shift in the import supply curve. For this to occur there would need to be a change in one (or more) of the variables that influence import supply, such as an additional discovery of foreign reserves. It is important to distinguish between movement along a curve and a shift in the curve; an "increase in the quantity of imports" is not the same as an "increase in import supply." The former refers to a situation where

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Under section 201, an adverse shift in total import supply reflects decreased foreign costs, increased productivity abroad, decreased foreign demand, or any combination of the the three. If foreign costs were to decline, imports would be cheaper in the U.S. market and this would lower the domestic price and expand domestic consumption. However, while domestic consumption (quantity demanded) would have increased, the lower domestic price would work a hardship on domestic firms, which would be forced to reduce their shipments. In this event imports would be a cause of injury to the domestic industry. This is because the causal factor that initiated the changes in the domestic market was the change in total import supply.

By contrast, under section 406, an adverse shift in Chinese import supply can operate only through its effect

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the quantity of imports increases as a result of an increase in the price of the product, or a movement along a given import supply curve, whereas the latter refers to a situation where the entire import supply curve has shifted to the right, i.e., a larger quantity of imports would be sold a the same price). These distinctions are crucial in our analysis.

on total import supply to the United States. Such shifts in Chinese import supply could reflect changes to Chinese cost, productivity and demand for the product in China. For this to result in material injury, this adverse shift in Chinese supply must also lead to a shift in total import supply. In that case, Chinese imports would be a cause of injury.

Under section 201, the total import supply related cause must be as important as any other cause. Under section 406, the focus is on supply from a particular country, rather than total import supply.

Finally, the causation standard is lower under section 406 than under section 201. Even if the effect of an increase in import supply from China is not as large as the effect of the decrease in domestic demand, or the effect of the increase in import supply from other countries, imports from China may still constitute a "significant cause" of material injury within the meaning of section 406.

B. Empirical Analysis

A review of the major factors that have affected the domestic industry in recent years clearly indicates that, although increasing imports from China have contributed to the domestic industry's troubles, they are not a significant cause of current injury. However, Chinese exports of APT to the U.S. do pose a threat of material injury to the domestic industry.

At the outset it should be emphasized that a proper review of the effects of imports of Chinese APT and tungstic acid on the domestic industry must take the world market into account. Tungsten concentrate and APT are highly fungible products and trade in an active international market.[27] APT is a commodity, and China is a major world supplier of that commodity.[28] In contrast, the U.S. role in this market is relatively

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[27] "Although there is no central metal exchange for tungsten, the market for tungsten bearing material, including intermediates, is a world market and is widely recognized among participants as such." Prehearing Economic Report of Respondents, p. 4.

[28] Prehearing Brief of The Refractory Metals Association at 6 and Transcript of Hearing (Tr.) at 34.

small: the United States accounted for only about 15 percent of world consumption of APT in 1986 and about 13 percent of world production.[29]

Imports from China affect the domestic industry through their presence in the U.S. market, as well as indirectly by their impact on world price. Section 406 only addresses the effects due to imports directly into the United States. The affect on the domestic industry from sales of China's products outside the United States can easily be more substantial than the affects of sales of China's products within the United States. Total Chinese exports of APT directly affect the world price of APT, which in turn affects the U.S. domestic price of APT, and therefore, the fortunes of domestic producers.

In recent years the U.S. tungsten industry has been adversely affected by these factors: (1) a substantial decline in world demand for tungsten bearing products; (2) a substantial increase in the world supply of tungsten;

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[29] Report at A-13, Table 1, Posthearing Brief of Respondents at Appendix 10, and Report at A-2.

and (3) a recent change in the PRC's internal policies[30] that has led it to increase its exports of APT (while holding its traditional exports of tungsten concentrate at a high level.[31]

World demand for APT was strong in the late seventies, but has been declining since 1981, particularly in the United States. This demand, it should be noted, is derived from the demand for downstream tungsten-bearing products such as tool steels, armaments, electrical products, and oil drilling bits.[32] Demand for APT has fallen partly because of reduced levels of activity in two of the industries that are large users of tungsten-bearing products -- machine tools and oil and gas drilling equipment -- and partly because of increased substitution of such materials as ceramics and cermet for

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30 See note 52, infra.

31 Between 1978 and 1986 the PRC's exports of tungsten concentrate as a percent of world consumption ranged between 13.1 percent (in 1982) and 29.5 percent (in 1983). Posthearing Brief of the Refractory Metals Association at Appendix VII (based on UNCTAD data).

32 Report at A-36.

tungsten.[33]

The increase in demand for tungsten during the late seventies led to increasing prices and efforts to discover new ore deposits. Those efforts were highly successful and resulted in a substantial increase in world supply.

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[33] Report at A-11-12. Congressional Research Service (CRS) "Economic Condition of the U.S.A. Tungsten Industry," p. 3. Over the past decade U.S. consumption of APT rose from 15.9 million pounds of tungsten content in 1975 to a peak of 20.2 million pounds in 1981 and then fell back to 14.3 million pounds in 1986. Report at A-13, Table 1, and Bureau of Mines Minerals Yearbook: Tungsten, 1980 and 1981. World consumption of tungsten concentrate apparently peaked in 1979 and declined irregularly thereafter. In 1979 world consumption was 112.9 million pounds (of contained tungsten). In 1986 it was 97.2 million pounds. Posthearing Brief of the Refractory Metals Association at Appendix VII (based on UNCTAD data). Moreover, there was a precipitous drop in domestic demand in 1982, when consumption fell from 20.2 million pounds to 12.9 million pounds, a decline of 36 percent. Id.

We recognize that consumption changes are not the same as demand shifts. A decrease in consumption can occur either as the result of decrease in domestic demand or domestic supply. (A decrease in imports could also result in a decrease in consumption, but such a change could not be a cause of harm.) Because real prices decreased over the relevant period, the decrease in consumption must have been due in large part, if not exclusively, to a decrease in demand.

> Between 1981 and 1984 total world reserves reported by the Bureau of Mines increased by almost 25 percent. The noncommunist world share of those reserves jumped from 35 percent to 44 percent, due in good part to Canada's leap from 10 percent to almost 21 percent of the world's total. The U.S. share remained constant at about 5 percent.[34]

The combination of declining demand and expanded world reserves after 1981 is the major reason for the extended decline that has occurred in the world price of tungsten concentrate.[35] Because tungsten concentrate is the

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[34] Mesher and Burrows, "On the Economics of the Tungsten Market," p. 2. Posthearing Brief of Respondents.

[35] "The major reasons for the extended decline in tungsten prices are overexpansion in mine capacity (in response to high prices and perceived capacity), shortages of the late 1970s, continued high mine production in less developed countries, weak demand as the result of effective competition from other materials and of process developments that result in reduced tungsten usage, and increased recycling, which reduces demand for the primary product. Mesher and Burrows, p. 1. A similar assessment was made at the hearing by Mr. Bunting, marketing manager for the domestic APT producer Strategic Minerals Corporation (Stratcor). "A few words about pricing, how these materials are priced. The London Metal Bulletin, LMB, publishes prices for tungsten ore concentrates twice a week. This is a reference for pricing tungsten source.

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major cost component in the price of APT, the decline in concentrate prices also explains the severe drop in APT prices.[36] APT prices reached a high in the first quarter of 1981, when demand was at its peak. In the next year and a half, prices dropped sharply by 25 percent and thereafter continued to fall every year through 1986. Between 1982 and 1986, the total decline in APT prices was 43 percent,[37] and the total decline in tungsten concentrate prices was about 50 percent.[38]

The role of Chinese exports of APT must be assessed against this backdrop of rising and then falling demand

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The peak pricing was reached in 1977 at about $177 per short ton unit, since then there has been a long decline down to the low in October of last year of about $31, in other words, a five-fold drop. It is clear the mediocre demand in recent years has combined with world production overcapacity of ore ammonium paratungstate and tungsten and a strong U.S. dollar to create a downward price spiral." Tr. at 11. (Emphasis added.)

36 Report at A-36-37. The cost of tungsten ore concentrate accounts for approximately 50 to 60 percent of the price of APT. Report at A-40, Table 19.

37 Report at A-38 and A-41.

38 Report at A-36, Table 18.

and increasing supply of tungsten. China first began to export APT to the U.S. market in 1980.[39] That year its estimated total exports of APT were between 1.1 and 2.2 million pounds (of which the U.S. took only 23 thousand pounds).[40] Chinese exports did not exert a significant influence on U.S. APT prices, which were relatively steady in 1980.[41] China's total exports of APT increased to between 2.2 and 3.3 million pounds a year, coincident with the abrupt fall in demand in 1982.[42] Therefore, in those years, Chinese exports contributed to the fall in prices that was sparked by the decrease in demand. In 1983, however, China's exports of APT to the world market

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39 For the period 1980 through 1983 the best available information about Chinese APT exports to the world market is a report by UNCTAD. "Recent Developments and short-Term Outlook in the Tungsten Market," Report by the UNCTAD Secretariat. On the quality of UNCTAD data for tungsten, see Report at A-25, note 1.

40 Report at A-25 and Bureau of Mines Minerals Yearbook: Tungsten, 1981, Table 14.

41 Report at A-38.

42 Id at A-25.

declined sharply to 1.1 million pounds,[43] as prices of APT continued to fall.[44] The fact that China's exports decreased in 1983 implies that China did not contribute to the decline in prices and thus had no negative effect on the domestic industry in that year. In the next three years, 1984-1986, [ * * * ], so they contributed to a downward trend in prices during this period.[45] However, the fact that total consumption in the United States fell sharply between 1984 and 1986, from 19.4 million pounds to 14.3 million pounds, indicates that the overriding reason for the poor performance of domestic APT producers over this period was a severe contraction in domestic demand.[46] Thus, any increase in Chinese imports to the United States during this period was not a significant cause of material injury.

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43 Id.

44 Between 1982 and 1983 the domestic price of APT fell by 17 percent. Id. at A-41.

45 Id. at A-26.

46 Id. at A-13, Table 1.

Threat

Neither section 406 nor the legislative history defines threat of material injury. In previous section 406 investigations, the Commission has applied the threat standard of section 201 in determining whether rapidly increasing imports threaten material injury to a domestic industry.[47] Under that standard, when determining whether there is a threat of serious injury, the Commission must consider:

> a decline in sales, a higher and growing inventory and a downward trend in production, profits, wages, or employment (or increasing underemployment) in the domestic industry concerned....and all [other] factors which it considers relevant.[48]

These factors have already been discussed in this investigation. Consumption, production, capacity

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47 See Ferrosilicon at 16 (Stern, Haggart, Lodwick); Canned Mushrooms from the People's Republic of China, Inv. No. TA-406-9, USITC Pub. 1293 (September 1982 at 29 (Eckes, Stern). Also, see Nonrubber Footwear, TA-201-55, USITC Pub. 1717 (Views of Vice Chairman Susan W. Liebeler) at 39.

48 19 U.S.C. 2251(b)(2)(1982).

utilization, employment of production and related workers, hours worked, compensation, domestic shipments, value of shipments and inventories were all down in 1985 and 1986.[49]

While the role of Chinese exports of APT is properly regarded as significantly less important than declining demand and increasing world supply, there is nonetheless a real prospect that Chinese exports could have significant adverse effects on the domestic industry producing APT in the near future. China is a major producer of APT and it possesses over one-third of the world's reserves of tungsten.[50] While China reportedly consumes most of its APT production domestically, it could easily expand its APT exports to the United States by a great deal.[51] Its APT shipments to the United States rose by 56 percent from 1984 to 1985 and very likely could have continued to rise

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[49] See notes 4-15 and accompanying text, supra.

[50] Mesher and Burrows, at 3, Tr. at 34, and Report at A-88, Table D.

[51] Id. at A-25.

at a comparable dramatic rate in 1986.[52] This did not happen, however, and instead imports declined by 15 percent that year.[53] We note that, in 1985, the domestic industry requested the President to initiate consultations with China and that informal discussions between the United States Special Trade Representative and Chinese officials took place in March 1986.[54] This action apparently dampened efforts by China to export to the United States.[55] Information about China's APT production, home consumption, and capacity are confidential. We note in general terms, however, that

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52 Id at A-13, Table 1.

53 Id.

54 Brief of The Refractory Metals Association, at 4.

55 According to an official of the Chinese government, tungsten and its products were brought under an export licensing program in July 1983. Apparently, however, that program did not have much effect on shipments to the United States until 1986. Prehearing Brief of Respondents China National Metals and Minerals Import and Export Corporation, China National Nonferrous Metals Import and Export Corporation, and China National Chemicals Import and Export Corporation, at 44. (Prehearing Brief of Respondents).

there is considerably more production than internal consumption, and that productive capacity is far from being fully used.[56] Furthermore, while most of China's APT plants are old, it is reported that some of them are being retrofitted, updated, or expanded.[57] This evidence indicates that China has a substantial potential to export additional APT to the United States and that it, therefore, threatens to be a significant cause of material injury to the domestic industry.

Because we believe it is highly probable[58] that APT and tungstic acid imports into the United States from the PRC will continue to increase, we determine that the domestic industry is threatened with material injury from rapidly increasing imports into the U.S. from the PRC.[59]

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56 Report at A-25.

57 E. Ho, "Changes in the pattern of Tungsten Trade," at 186, in Prehearing Brief of Respondents.

58 The Commission traditionally requires that the threat be real rather than speculative, and that injury be highly probable in the foreseeable future. Nonrubber Footwear: Report to the President, Inv. No. TA-201-50, USITC Pub. No. 1545 (1984) at 19.

59 Chairman Liebeler believes that threat will exist whether or not a remedy is imposed on APT and tungstic acid because of the ease of circumvention of any remedy imposed on those products alone. See note 64-65 infra, and accompanying text.

Remedy

Since imports of Chinese APT and tungstic acid are a significant threat of material injury to the domestic industry, it is necessary to recommend a remedy to the President that will prevent this injury from occurring.[60] However, because of the nature of the market for APT, an effective remedy is extraordinarily difficult to find in this case. Nonetheless, we are bound under the statute to make a remedy recommendation.[61]

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60 19 U.S.C. §2436(b). We note that different factors influence the Commission's remedy recommendation under section 201 and section 406. Most significantly, under section 201 the purpose of relief is to facilitate the orderly adjustment to import competition. 19 U.S.C. § 2251(a)(1). There may be instances where providing import relief in the form of a tariff or quota will hinder rather than help an industry's adjustment efforts. See Unwrought Copper, Inv. TA-201-52, USITC Pub. 1656, at 53 (Views of Vice Chairman Liebeler on Injury and Remedy). Section 406 does not refer to such industry adjustment. Instead, the remedy under section 406 must simply prevent the injury to the domestic industry caused by the imports from the specific country. The promotion or deterrence of adjustment has no relevance.

61 Chairman Liebeler notes that a recommendation that no

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Therefore, subject to two crucial caveats explained below, Chairman Liebeler recommends a market share quota based on the market penetration of Chinese imports in 1986, 14.8 percent, and Vice Chairman Brunsdale recommends a quota to limit annual imports to the quantity achieved in 1986.

The domestic industry recommends a market-share quota on imports of APT and tungsten acid from China. Their quota would last for five years and restrict the annual quantity of imports to an amount not exceeding 7.5 percent of total annual domestic consumption.[62] The 7.5 percent figure is based on the average annual market share for Chinese imports over the period 1982-1984. As explained in the previous section, Chinese imports are not a significant cause of material injury. However, assuming arguendo that they are, would this measure accomplish what the statute says it must, i.e., would it remedy the

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import relief can prevent or remedy the injury or threat is a remedy recommendation.

[62] Posthearing Brief of the Refractory Metal Association at 9-10.

material injury suffered by the domestic industry? There are two reasons why it would not.

First, the proposed quota is not likely to be effective because it would only affect imports into the United States from China. It does not and could not affect total exports from China or total imports into the United States. As discussed in the previous section, it is total exports from China that affect world prices of tungsten products. If an import quota is placed on Chinese APT, China would still be free to export to other countries, such as Japan and the European Community countries.[63] The initial effect of the quota would be to create a shortage of APT in the United States and boost domestic price. This higher price could be expected to attract imports from non-restrained countries. That would create temporary shortages in those countries and attract product from a country with an excess capacity to export

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[63] We note, however, that, according to the Refractory Metals Association, a dumping suit is currently being prepared in EC against China on APT, tungstic oxide, and ferro tungsten. Tr. at 12.

-- China. As a result, world exports from China would change very little. After a dynamic process of price adjustments up and then down, and of changes in the pattern or composition of trade, world prices would not change significantly.

Consequently, after the adjustments were completed, total imports into the United States would probably not have changed much either. Reduced imports from China would be replaced by imports from other sources. In short, the basic conditions affecting the domestic industry would be the same after the imposition of the import quota as they were before. Thus the effect of the quota on China is expected to result merely in a shift in the country distribution of U.S. imports, with little resulting benefit to the domestic industry.

Second, the proposed quota is also not expected to be effective because it would induce China to shift into downstream products. In particular, it would be likely to induce China to export more tungsten powder to the United States because of the low costs involved in shifting production into downstream products.[64] Indeed the

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[64] Processing of APT and tungstic acid to tungstic oxide is a relatively simple and inexpensive step. The cost of converting APT to yellow or blue oxide is 15 cents per pound of tungsten content, as compared with $1.75 for conversion of ore concentrate to APT. Report at A-7.

Refractory Metals Association acknowledges that an import remedy imposed on APT alone would be ineffective:

> The RMA requests that these quotas be applied to APT (TSUS 416.40) and Tungstic Acid and Tungstic Oxide (TSUS 417.60). Imports of Tungstic Acid and Tungstic Oxide have not been large over the period covered by this investigation. However a quota must be applied to these products (both imported under TSUS 417.60) if the quota on imports of APT is to be effective A quota on APT could easily circumvented by the PRC producers, by simply shifting production to tungstic acid and tungstic oxide. Such a procedure could be accomplished by PRC producers with little difficulty.[65]

For both of these reasons it is unlikely that an import quota on Chinese APT and tungstic acid would be effective. Yet the statute limits the Commission to a remedy recommendation expressed in terms of imports from China and limited to the products that are subject to investigation.[66] Thus, for purposes of making our remedy recommendations, we assume (1) there will be no

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65 Brief of the Refractory Metals Association at p. 23-24 (emphasis added).

66 19 U.S.C. §2436(a)(3) and (b)(1).

significant shifts in the country distribution of APT and tungstic acid imports into the United States and (2) there will be no significant increase in the degree of processing of imported tungsten products from China. Subject to these assumptions, we recommend an import quota.

Since imports from China are not yet a significant cause of material injury, we need to choose a quota that will prevent them from becoming such.[67] While it is not possible to specify precisely the level of imports that would make imports a significant cause of material injury, the general concept of threat is that the current or recent level of imports is very close to the requisite threshold level.

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[67] We recommend an import quota instead of a tariff, a tariff-rate quota, or an orderly marketing agreement. We do not choose a tariff because the effect on the quantity of imports from a tariff imposed on a nonmarket economy is too difficult to determine. The usual demand and supply forces that are taken for granted in market-oriented countries are not expected to operate to a sufficient degree in a nonmarket economy, such as China's, to make it possible to obtain reliable estimates for the effects of tariffs on their imports. For similar reasons we do not recommend a tariff-rate quota. Finally, we do not choose an orderly marketing arrangement because such an arrangement would impose unnecessary social costs on the United States.

Accordingly, Chairman Liebeler recommends a market share quota at the 1986 market share of 14.8 percent[68] since, as discussed above, at that level of import penetration imports of APT were not found to be a significant cause of material injury. Chairman Liebeler finds and recommends that in order to remedy the market disruption found with respect to imports of ammonium paratungstate and tungstic acid from the People's Republic of China,[69] it is necessary to impose a market share quota for a period of five years, restricting the combined

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68 Report at A-32.

69 The statute directs the Commission to recommend import restrictions which are necessary to prevent or remedy market disruption which exists with respect to an article produced by the domestic industry. While the recommendations which we make will affect imports from China of APT and tungstic acid, and thereby remedy the market disruption to the industry producing APT and tungstic acid, it is highly likely that resultant circumvention will render the recommended relief of little use. First, as discussed previously, the market for these products is a world market and imports from other countries will likely increase as Chinese exports are diverted elsewhere. Second, to the extent Chinese exports of APT and tungstic acid actually decrease, it will likely be because China has made the relatively easy switch to downstream products, which the domestic industry also produces.

volume of such imports to 17.2 percent of U.S. consumption.[70]

Vice Chairman Brunsdale recommends that the quota be set equal to the quantity of imports that entered the United States in 1986. For APT, this quantity is 2.114 million pounds (tungsten content); for tungstic acid, it is 345 thousand pounds (tungsten content).[71] Finally, she recommends that the quota be in effect for five years.[72]

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70 This number was arrived at by dividing the 1986 level of U.S. consumption of APT and tungsic acid from China (2,459 thousand pounds) (Report at A-29) by U.S. consumption in 1986, (14,275)(Report at A-32). The 1986 market share was used as a basis for the market share quota because, at that level of import penetration in 1986, Chairman Liebeler found imports of APT and tungstic acid not to be a significant cause of material injury.

71 Report at A-29, Table 15.

72 The statute permits the remedy to remain in effect for no more than five years. 19 U.S.C. § 2253(a).

# INFORMATION OBTAINED IN THE INVESTIGATION

## Introduction

On March 5, 1987, the U.S. International Trade Commission (Commission) received a letter from the United States Trade Representative (USTR) requesting that the Commission conduct an investigation under section 406 of the Trade Act of 1974. 1/ The USTR requested that the Commission determine whether market disruption exists by reason of imports from the People's Republic of China (China) of ammonium paratungstate (APT) and tungstic acid, provided for in items 417.40 and 416.40, respectively, of the Tariff Schedules of the United States (TSUS). Effective March 5, 1987, the Commission instituted investigation No. TA-406-11. This investigation was instituted under the provisions of section 406(a)(1) of the Trade Act of 1974, which states that "upon request of ... the United States Trade Representative, ... the International Trade Commission shall promptly make an investigation to determine, with respect to imports of an article which is the product of a Communist country, whether market disruption exists with respect to an article produced by a domestic industry." Market disruption, as defined in section 406(e)(2), "exists within a domestic industry whenever imports of an article, like or directly competitive with an article produced by such domestic industry, are increasing rapidly, either absolutely or relatively, so as to be a significant cause of material injury, or threat thereof, to such domestic industry." The statute directs that the Commission report its determination to the President by not later than 3 months after the date on which the request is received or, in this investigation, by June 5, 1987.

Notice of the Commission's investigation and of the 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, DC, and by publishing the notice in the Federal Register of March 19, 1987 (52 F.R. 8654). 2/ The hearing was held in Washington, DC, on April 29, 1987. 3/ The briefing and vote with regard to injury in this investigation was held on May 22, 1987. The briefing and vote with regard to remedy was held on May 27, 1987.

## Background

In December 1985, the USTR received a petition from the Refractory Metals Association (RMA) requesting, under section 406(d)(1) of the Trade Act of 1974, that the President initiate consultations with China to limit imports of the subject products to noninjurious levels. 4/ The RMA agreed to hold its petition in abeyance while the USTR held informal consultations with the

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1/ 19 U.S.C. § 2436. A copy of the letter is presented in app. A.

2/ A correction to the notice of institution was published in the Federal Register of Apr. 8, 1987. Copies of these notices are presented in app. B.

3/ A list of the witnesses who appeared at the hearing is presented in app. C.

4/ The RMA's petition to the USTR asserted that imports of APT and tungstic oxide are the cause of market disruption, whereas the USTR's letter to the Commission referred to imports of APT and tungstic acid as the alleged cause of disruption. * * *. APT accounts for 90 percent of the imports under investigation and represents a much larger part of the U.S. market. The RMA's

(footnote continued on next page)

Chinese. These negotiations, held in March 1986, were considered by the RMA to be ineffective and they reintroduced their petition in November 1986, with the additional request that the USTR ask the Commission to conduct an investigation under section 406(a)(1).

The RMA is a trade association of processors and fabricators of refractory metals, one of which is tungsten. The membership includes firms accounting for all current domestic production of APT and tungstic acid, and many major U.S. consumers of the products. * * *.

## The Products

### Description and uses

APT and tungstic acid are chemical intermediates produced from tungsten ores or recycled from scrap, and are used in a variety of end-use applications. Tungsten is of commercial importance in a number of areas because of certain unique properties: density, tensile strength, hardness, and the highest melting point of any metal.

Tungsten ore and intermediate products may be measured by gross weight but are more frequently measured in terms of tungsten content, either as "contained tungsten" (W) or "contained tungstic oxide" ($WO_3$). (Tungsten's chemical abbreviation is W, for wolfram, its German name.) This report will refer to pounds of tungsten content (lbs W) to quantify capacity, production, shipments, and inventories of the subject products. However, APT is generally sold in quantities of short ton units (stu's). Pricing, therefore, will be presented in terms of dollars per stu. An stu is 20 lbs $WO_3$ and 15.862 lbs W.

About 90 percent of the tungsten ore that is mined is processed into APT; the remaining 10 percent finds limited use in steel tool manufacture, or in the production of ferrotungsten. 1/ APT is the most common intermediate tungsten product, and is widely available on world markets. It is a relatively homogeneous product, easily handled, shipped, and stored. APT takes the form of a white powder that may be more or less dust-like or coarse in consistency. Various trace impurities are present in the product, depending on the raw material and the processing technique used.

The vast majority of APT undergoes further processing, reaching one of several stages at which it serves as an end product. An estimated 60 percent of APT is processed into tungsten carbide powder, which is used to impart hardness both to cutting edges in machine tools and drill bits and to metal

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(footnote continued from previous page)
remedy proposal includes restrictions only on imports of APT and tungstic acid from China. Although APT and tungstic acid are the products subject to this investigation, the potential of tungstic oxide to substitute for APT is described in the product section of this report.

1/ Research is being conducted on the feasibility of bypassing APT production and preparing tungsten metal powder and tungsten carbide powder directly from tungsten ore concentrates or impure tungsten compounds. * * *. Generally, however, this process is not considered to be commercially viable. Should research lead to widespread use of this procedure, there could be a significant reduction in the demand for APT and other tungsten intermediates.

surfaces in forming and shaping dies and other wear-resistant parts. Another 30 percent of APT is upgraded to the form of tungsten metal powder, which is used in the manufacture of products such as filaments in electric lamps and cathodes in electronic tubes, and in other electrical applications. Tungsten metal is also used as a counterweight and balance in aircraft and in armament applications. About 9 percent of APT is used as an alloy constituent in high-speed and tool and die steel and in superalloys and nonferrous alloys; another 1 percent is processed into other tungsten chemicals for various nonmetallurgical applications. A small amount of APT is used directly as a catalyst in the purification of petroleum products.

Although tungstic acid may directly precede APT in the production process, it is not sold as such by U.S. producers of APT. * * *. For the most part, however, consumption of tungstic acid other than in the production of other tungsten products is minimal. All available information on tungstic acid will be presented in this report; however, the primary focus of discussion will be on APT.

Manufacturing process

Tungsten is a relatively rare element and occurs naturally in various mineral forms. 1/ Two main ore types are of commercial significance--wolframite and scheelite. These ores are extracted using predominantly underground mining techniques. Most of the world's tungsten mines are small, producing less than 4.4 million lbs W per day of raw ore. In 1982, five mines reported significant production in the United States. Currently, because of weak demand for tungsten products and intense overseas competition, all tungsten mines in the United States and Canada are shut down or idle. 2/ In this investigation, U.S. producers of APT were asked to report their production and purchases of ore concentrates by sources, as shown in the following tabulation (in thousands of lbs W):

| Year | Domestic | Chinese | Other countries | Total |
|---|---|---|---|---|
| 1982..... | 2,295 | *** | 2,469 | *** |
| 1983..... | 1,430 | 430 | 4,355 | 6,215 |
| 1984..... | *** | *** | 8,567 | 10,092 |
| 1985..... | *** | *** | 6,219 | 8,008 |
| 1986..... | *** | 1,042 | 3,831 | *** |

Use of domestic ore concentrates declined in both absolute and relative terms during the period of investigation. U.S. producers were more dependent on foreign sources of concentrates than on U.S. sources throughout 1982-86, although imports declined after 1984. China supplied increased quantities of ore concentrate from 1984 to 1986 even though consumption of this raw material declined in these years. 3/ The RMA is supporting a request to the U.S. Congress to pass legislation eliminating the tariff on tungsten ore concentrates. This tariff stands at $0.17 per lb W. Although previously of little significance, with the declining price of concentrates, the tariff now accounts for some 7 percent of the cost of imported concentrates.

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1/ See app. D for 1985 world tungsten reserves and production.

2/ During 1986, there were three mines in the United States that produced tungsten ore intermittently.

3/ Data on U.S. imports of tungsten ore concentrates are presented in app. E.

Another source of tungsten ore concentrates is the U.S. National Defense Stockpile; since 1972, the U.S. General Services Administration (GSA) has been coordinating the sale of excess inventories of tungsten concentrates. Respondents allege that such sales have been a cause of disruption in the domestic tungsten market. The price effects of such sales are detailed in the section "GSA stockpile sales." Annual domestic sales of tungsten ore concentrates by GSA are presented in the following tabulation (in thousands of lbs W): 1/

| Year | Quantity |
|---|---|
| 1980 | 2,016 |
| 1981 | 1,519 |
| 1982 | 219 |
| 1983 | 612 |
| 1984 | 2,553 |
| 1985 | 1,436 |
| 1986 | 90 |

Because ore deposits that are mined generally contain only between 0.3 and 1.5 percent $WO_3$, the tungsten content of the ore must be enriched substantially before the ore concentrates can be used to produce refined tungsten chemicals. Beneficiation facilities that are associated with each mine (mills) can concentrate the tungsten content of the ore to about 60 to 75 percent $WO_3$, using primarily physical methods (crushing, grinding, and gravity separation). However, the use of high-pressure leaches (i.e., dissolving techniques) containing sodium carbonate permits tungsten concentrates containing as little as 10 percent $WO_3$ to be further refined into tungstic acid and APT. Flotation methods may be used to concentrate certain scheelite ores. These beneficiation facilities can also extract tin, bismuth, molybdenum, copper, gold, and silver ore concentrates from tungsten ores, when such elements are present.

In the production of APT or tungstic acid from the ore concentrates, the concentrates may be pretreated by leaching (in an acid solution to remove phosphorus, arsenic, and sulfur impurities) or roasting (which also decreases the sulfur and arsenic content) before entering the digester process described below. Although the exact processing steps used to produce APT or tungstic acid from the ore concentrates vary from one refining plant to another, the following description of the manufacturing process is generally applicable. For ore concentrate derived from scheelite, the concentrate is either digested with sodium carbonate (at high pressure if the grade of scheelite is low) or leached with acid. To digest ore concentrate derived from wolframite, the concentrate can be heated with sodium carbonate and leached with hot water or, alternatively, the ore may be decomposed by reaction with sodium hydroxide at high temperatures. The crude sodium tungstate/tungstic acid 2/ that is produced is separated by filtration and is purified to remove silicon, phosphorus, arsenic, tin, molybdenum, and heavy metal impurities. The resulting purified sodium tungstate solution can then be converted into tungstic acid by the addition of acid, or, more typically, the sodium tungstate is converted into ammonium tungstate by the use of an ion solvent exchange. APT crystals are formed by evaporating the purified ammonium tungstate solution. The manufacturing process for the production of APT or

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1/ Obtained from the Office of National Defense Stockpile, Stockpile Contracts Division.

2/ * * *.

tungstic acid can easily be modified to produce other refined chemical intermediates such as sodium tungstate or potassium tungstate. Figure 1 illustrates the tungsten processing sequence and identifies the major chemical forms at each step.

APT may also be produced from recycled tungsten scrap. As recycling techniques have improved, the percent of tungsten material produced from secondary sources has risen, reducing demand for tungsten ore concentrates. The cost of transporting scrap is less, relative to its tungsten content, than that for concentrates. Production of APT from tungsten scrap is similar to production from ore concentrates; however, the cost is significantly lower because scrap contains fewer impurities than do concentrates. Also, the nickel byproduct of scrap conversion may be reclaimed for other uses. U.S. producers of APT were asked to report their use, by sources, of scrap in the production of APT, as shown in the following tabulation (in thousand of lbs W):

| Year | Domestic | Foreign | Total |
|---|---|---|---|
| 1982..... | 1,647 | *** | *** |
| 1983..... | 1,523 | *** | *** |
| 1984..... | 1,626 | *** | *** |
| 1985..... | 2,140 | *** | *** |
| 1986..... | 1,157 | *** | *** |

These data show that the quantities of scrap consumed in the production of APT were greatest, absolutely and relative to production, in 1982 and 1985, following periods of strong demand for tungsten products in 1978-81 and 1984. Imports of scrap * * *. No domestic use of Chinese scrap was reported.

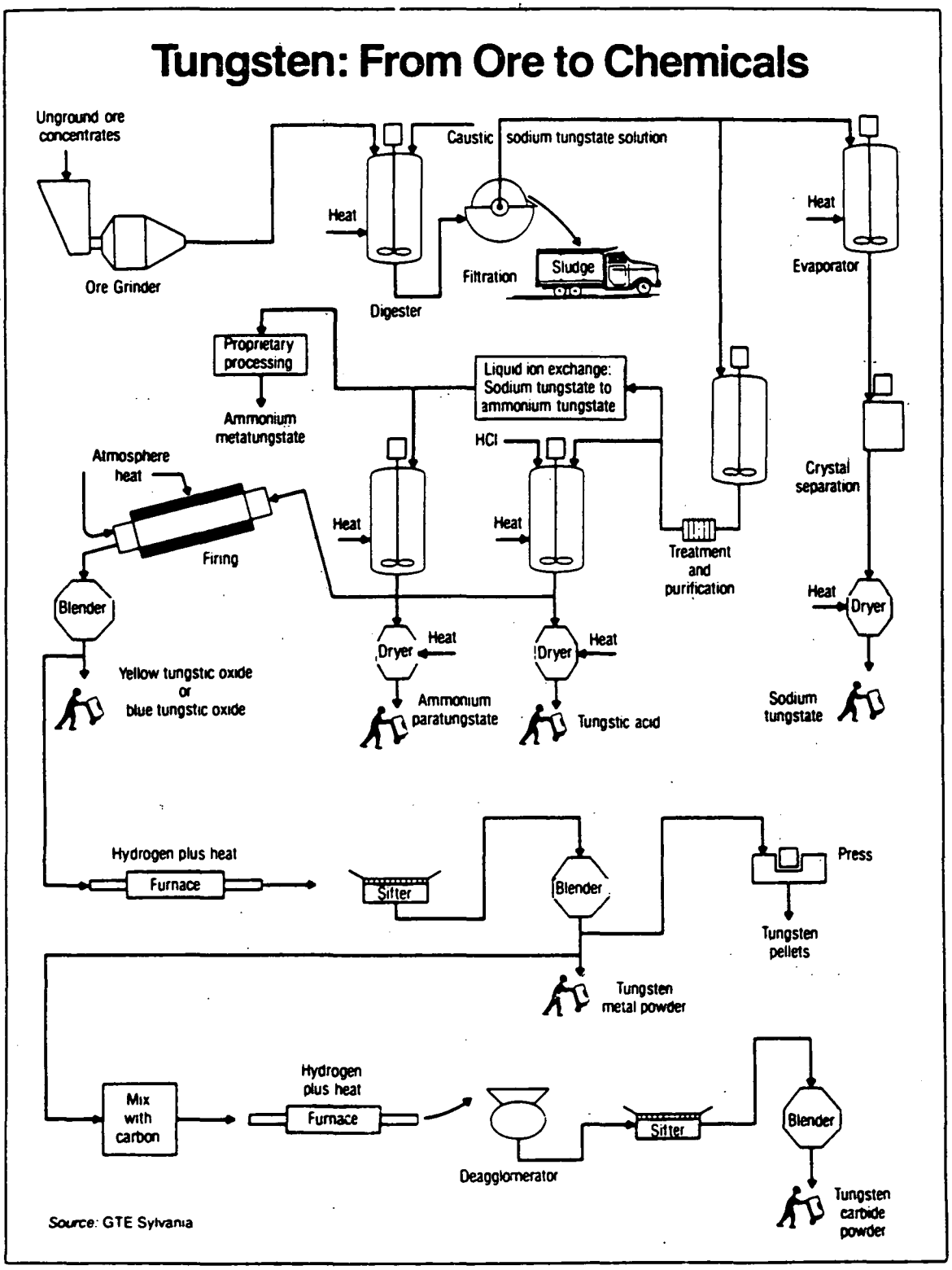
Because APT and tungstic acid of high purity (more than 99.9 percent) can be produced using fairly standard processes, those chemical intermediates represent the most highly processed products made from tungsten that nevertheless remain basic commodities of trade in the tungsten industry.

Processing of APT and tungstic acid into tungstic oxide is a relatively simple and inexpensive step. Although APT may be reduced directly to the metal powder, in most production processes the APT is first converted into a tungstic oxide, which is then reduced to tungsten powder. When APT is heated above 250° C in an open-air system, "yellow" oxide (tungstic oxide--$WO_3$) is produced. More frequently in the United States, however, the APT is heated in a slightly reducing atmosphere system to produce "blue" oxide ($W_4O_{11}$), which is actually a mixture of two oxides.

The yellow and blue oxides are further reduced to the metal powder. Tungsten metal powder can then be reacted with carbon black to produce tungsten carbide powders. Such further downstream production of tungsten metal powder and tungsten carbide powder requires a great deal of quality control and makes use of rather specialized techniques. These more advanced products are considered to be specialized products in the tungsten industry. Estimated costs in the United States of the various steps in the production of tungsten carbide tools and machine parts are presented in the following tabulation (per lb W): 1/

1/ Compiled by * * * based on industry averages. Company-specific data on the cost of production of APT are presented in app. F.

Figure 1


Tungsten: From Ore to Chemicals
Unground ore concentrates
Ore Grinder
Heat
Digester
Caustic
sodium tungstate solution
Filtration
Sludge
Heat
Evaporator
Proprietary processing
Ammonium metatungstate
Liquid ion exchange: Sodium tungstate to ammonium tungstate
Atmosphere heat
Firing
Heat
HCl
Heat
Treatment and purification
Crystal separation
Heat
Dryer
Blender
Yellow tungstic oxide or blue tungstic oxide
Dryer
Heat
Ammonium paratungstate
Dryer
Heat
Tungstic acid
Sodium tungstate
Hydrogen plus heat
Furnace
Sifter
Blender
Press
Tungsten pellets
Tungsten metal powder
Mix with carbon
Hydrogen plus heat
Furnace
Deagglomerator
Sifter
Blender
Tungsten carbide powder
Source: GTE Sylvania

| Production step | Estimated cost |
|---|---|
| Mining and milling of tungsten ore | $3.25-$6.50 |
| Conversion of ore concentrate to APT | 1.75 |
| Conversion of APT to yellow or blue oxide | 0.15 |
| Conversion of blue oxide to tungsten metal powder | 1.65 |
| Conversion of tungsten metal powder to tungsten carbide powder | 0.70 |
| Production of tungsten carbide end product | 14.00-30.00 |

U.S. tariff treatment

APT is provided for in item 417.40 of the TSUS and tungstic acid is provided for in item 416.40. Item 417.40 includes ammonium metatungstate as well as APT, but the U.S. Bureau of Mines tungsten specialist informed the Commission staff that ammonium metatungstate is a specialized and uncommon product that is not imported from China. Other tungsten products, their TSUS classifications, and their current column 1 rates of duty 1/ are presented in the following tabulation (in percent ad valorem except as noted): 2/

| Product | TSUS item | Rate of duty as of Jan. 1, 1987 |
|---|---|---|
| Calcium tungstate | 418.30 | 10 |
| Potassium tungstate | 420.32 | 10 |
| Sodium tungstate | 421.56 | 10 |
| Tungsten carbide | 422.40 | 10.5 |
| Other tungsten compounds | 422.42 | 10 |
| Mixtures of two or more inorganic compounds in chief value of tungsten | 423.92 | 10 |
| Tungsten ore/ore concentrate | 601.54 | $0.17 per lb W |
| Ferrotungsten and ferrosilicon tungsten | 606.48 | 5.6 |
| Waste and scrap containing by weight not over 50 percent of tungsten | 629.25 | 4.9 |
| Waste and scrap containing by weight over 50 percent of tungsten | 629.26 | 4.2 |
| Unwrought tungsten other than alloys; lumps, grains, and powders | 629.28 | 10.5 |
| Unwrought tungsten other than alloys; ingots and shot | 629.29 | 6 |
| Unwrought tungsten other than alloys; other | 629.30 | 6.6 |
| Tungsten alloys; containing by weight not over 50 percent of tungsten | 629.32 | 4.7 |
| Tungsten alloys; containing by weight over 50 percent of tungsten | 629.33 | 6.6 |
| Wrought tungsten | 629.35 | 6.5 |

1/ Col. 1 rates of duty are applicable to imported products from all countries except those Communist countries and areas enumerated in general headnote 3(d) of the TSUS. However, such rates do not apply where preferential treatment is accorded to products of developing countries under the Generalized System of Preferences or the Caribbean Basin Economic Recovery Act, or to products of Israel under the special rates of duty column.

2/ U.S. imports of selected tungsten products are presented in app. E.

Tungstic oxide is classified in "other tungsten compounds," TSUS item 422.42.

China was granted most-favored-nation (MFN) tariff treatment as of February 1, 1980. Prior to that date, the rates of duty applicable to imports of APT and tungstic acid from China were the column 2 rates 1/ of 49.5 percent and 55 percent ad valorem, respectively. The column 2 rates of duty for these products have not changed during 1980-87. The column 1 rates of duty, applicable to imports from China since February 1, 1980, have been reduced in stages during the period of investigation because of concessions made by the United States in the most recent (Tokyo) Round of the Multilateral Trade Negotiations (MTN). These duty rates are presented in the following tabulation (in percent ad valorem):

| As of January 1-- | APT | Tungstic acid |
|---|---|---|
| 1981..... | 12.5 | 13.9 |
| 1982..... | 12.1 | 13.3 |
| 1983..... | 11.7 | 12.8 |
| 1984..... | 11.2 | 12.2 |
| 1985..... | 10.8 | 11.6 |
| 1986..... | 10.4 | 11.1 |
| 1987..... | 10.0 | 10.5 |

Imports under TSUS items 416.40 and 417.40 from designated beneficiary developing countries are not eligible for duty-free entry under the Generalized System of Preferences but are eligible for duty-free entry under the Caribbean Basin Economic Recovery Act. Imports from Israel under TSUS items 416.40 and 417.40 are currently dutiable at 4.2 percent and 4 percent ad valorem, respectively, under the United States-Israel Free Trade Area Implementation Act. These duty rates for Israel are scheduled to be reduced to free in 1989.

## U.S. Producers

Six firms produced APT in the United States during the period of this investigation (1982-86). Two of these (AMAX, Inc., and Strategic Minerals Corp. (Stratcor)) produce APT primarily for sale on the open market. Four other firms (General Electric Co. (GE); GTE Products Corp. (GTE); Li Tungsten, Inc.; and Teledyne Wah Chang Huntsville (Teledyne Wah Chang)) produce APT primarily for internal consumption. During the period of investigation, noncaptive shipments of APT represented 40 percent of the total U.S. market. In this report, separate data for the captive and noncaptive markets will be presented to the extent that they are available and the distinctions are meaningful.

For a conversion fee, * * * also process ore into APT for unrelated firms that provide the ore and own the APT produced. Firms that obtain such toll conversion services from U.S. producers may either sell the APT on the open market, * * *, or consume it internally, * * *.

* * * produces crude tungstic acid during the APT manufacturing process but all such material is further processed into APT. Only * * * produced very small quantities of tungstic acid for sale during the period of investigation.

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1/ Col. 2 rates of duty apply to imported products from those Communist countries and areas enumerated in general headnote 3(d) of the TSUS.

Such production was * * * and the total estimated volume during 1982-86 was * * *. * * *. U.S. production for sale of tungstic acid was insignificant relative to U.S. production of APT. No further information is available on U.S. production of tungstic acid.

AMAX, a large company with various mining interests, supports the petition. AMAX is the largest producer of tungsten in the market economy countries, with major reserve holdings in Canada and the United Kingdom. Development of these reserves has been stalled by the declining price of tungsten ore concentrates on the world market. AMAX's divisions include the Climax Molybdenum Co., which operates the Climax mine and ore mill in Climax, CO, and an APT plant in Fort Madison, IA. The Climax mine is primarily a molybdenum mine; tungsten is produced only as a byproduct. As the molybdenum market has declined, so has production at the Climax mine. Mine operations were suspended from September 1982 to April 1984, for several more months in mid-1986, and again in March 1987, for an indefinite period. * * *. AMAX accounted for somewhat less than * * * of U.S. production of APT during 1982-86 and was a major supplier to the noncaptive market. The Fort Madison APT plant was completed and began production in 1981. It was idled because of * * * during June-September 1986, and again in March 1987. The plant produced APT primarily from * * *. Some tungsten assets, including the APT plant, were transferred from AMAX to its majority-owned subsidiary Canada Tungsten Mining Corp., Ltd., in early 1986. * * *.

GE, a fully integrated producer of tungsten products, supports the petition. GE through its subsidiary Utah International reopened the Springer mine in Pershing County, NV, and constructed an ore mill and APT plant complex at the mine site, but the facility operated only during March-October 1982. A 20-percent interest in Utah International was sold in January 1983. GE accounted for about * * * of U.S. production of APT during 1982-86 and was the * * *. GE's current APT production facilities are in Euclid, OH. * * *. For a conversion fee, GE also processes other firms' APT * * * into tungsten powders.

GTE also supports the petition. Its Chemical and Metallurgical Division produces APT at a facility in Towanda, PA, which GTE claims is the world's largest and most modern tungsten chemical plant. GTE consumes internally the majority of the APT it produces and sells a smaller amount on the open market; * * *. GTE is the * * *. GTE processes tungsten ore concentrates into APT for * * *. Likewise, GTE processes other firms' APT * * * into tungsten powders for a toll charge. In addition to APT, the Towanda facility produces other tungsten chemicals such as tungstic oxide, sodium tungstate, and ammonium metatungstate; a full range of downstream products including tungsten metal powders, tungsten carbide powders, and tungsten carbide grade powders (blended with cobalt); and a line of molybdenum chemicals and powders. Other production facilities of GTE's Chemical and Metallurgical Division consume tungsten powders in the production of a wide variety of end products.

Li Tungsten * * * ceased production in mid-1985, filed for bankruptcy in July 1985, and closed its APT facility in Glen Cove, NY, in * * *. * * *. Li Tungsten is a * * * subsidiary of Wah Chang Smelting & Refining Co. of America, Inc. (Wah Chang Smelting); * * *. Li Tungsten is currently seeking financial backing to enable it to resume operations in Buffalo, NY. * * *. * * * of its APT was used internally in the production of tungsten powders; * * * was sold on the open market.

Stratcor, formerly part of Union Carbide, supports the petition. Stratcor is the * * *, accounting for over * * * of total U.S. production during 1982-86. Company officials estimate that APT accounts for some * * * of Stratcor's sales. U.S. Tungsten Corp., formerly Umetco Minerals Corp., a subsidiary of Stratcor, owns and operates the Pine Creek tungsten mine and an APT plant on a site near Bishop, CA. Union Carbide's Emerson mine and ore mill in Lincoln County, NV, were shut down in April 1982. * * * of Stratcor's APT production during 1982-86 was from scheelite mined at the Pine Creek site. However, mining operations were suspended in May 1986, * * *. They maintain that both their mining and APT facilities are very productive and that the quality of their APT is highly competitive. Production in 1986 was * * * ore concentrates. The APT produced was mostly sold on the open market; only a small portion was sold to other Stratcor subsidiaries. * * * converting into APT the ore mined at Teledyne Wah Chang's Strawberry mine, located near the Bishop plant, which was permanently closed in December 1986. * * *.

Teledyne Wah Chang Huntsville, a subsidiary of Teledyne Industries, Inc., also supports the petition. Teledyne Tungsten, another subsidiary, owns the Strawberry mine in North Fork, CA, which operated during 1977-86, except during the winter months because of heavy snowfalls. The mine was permanently shut down in December 1986, as known reserves have been depleted. This ore was processed into APT by Stratcor's nearby U.S. Tungsten facility. Teledyne Wah Chang's own APT plant in Huntsville, AL, is designed to produce APT from tungsten scrap. Teledyne Wah Chang accounted for about * * * of total U.S. production of APT during 1982-86. The company consumes * * *; purchases of APT, therefore, are * * * production. During 1982-84, Teledyne Wah Chang relied on China for * * *. * * *. Teledyne Wah Chang's own production, production by Stratcor, purchases, and imports * * * were all further converted into tungsten powder and tungsten carbide powder and sold to Teledyne Firth Sterling and other customers. All three of these Teledyne subsidiaries are fully owned. For a conversion fee, Teledyne Wah Chang also processes other firms' APT, including imports from China, into tungsten powder and tungsten carbide powder.

## U.S. Importers

Thirteen firms have been identified as importers of Chinese APT; three are known to have imported tungstic acid from China. Questionnaire responses were received from 12 of the APT importers, including all of the tungstic acid importers. Imports of APT from China during the period of investigation as reported in these questionnaire responses exceed such imports as identified by official statistics of the U.S. Department of Commerce (Commerce).

* * * the largest importer of the products from China during the period of investigation * * *. * * * are other major importers. * * * are international commodities traders. * * * is an end user * * *. * * *. Smaller quantities of APT and tungstic acid are imported by other trading companies and by end users, including * * * U.S. producers of APT, who upgrade them to other tungsten products. Selected importers' shares of 1982-86 imports of APT from China, as reported in questionnaire responses, are presented in the following tabulation (in percent): 1/

* * * * * * *

1/ Because of rounding, figures may not add to the totals shown.

## Brokers/Traders

Reportedly, some firms purchase APT from importers and offer it for sale to end users. Numerous firms were identified by domestic producers as engaging in this activity, but most of the firms contacted responded that they in fact were the importer of any Chinese APT they sold. Most importers identified only end users among their major purchasers of APT; * * * reported sales in 1986 to an alleged trader/broker but this trader * * * did not respond to the trader/broker questionnaire. * * *. The volume of Chinese APT handled in this way appears to be relatively small.

## End Users/Consumers

The RMA estimates that some 50 firms consume tungsten in some product form; however, many powder consumers prefer to buy the downstream products directly so APT buyers are much fewer in number. Buyers of APT fall into two groups--captive and noncaptive. * * *. Major noncaptive buyers include * * *. All captive and some noncaptive buyers process APT into tungsten powders themselves; most of the latter, however, have it converted by GE, GTE, or Teledyne. A few companies, of which * * * is the most important, purchase APT for various chemical applications. Most end users do not import large quantities of Chinese APT directly; many do, however, purchase Chinese APT from U.S. importers.

## U.S. Consumption

Tungsten products serve the mining, energy, metal, defense, aviation, chemical, automotive, construction, and electronics industries. The demand for APT in the United States, therefore, reflects in part the level of general U.S. economic activity. Trends in consumption, however, follow more closely the growth and decline of the major industrial sectors that consume it. Many of these sectors are themselves facing declining demand. APT demand has paralleled trends in energy exploration in particular. Tungsten products have encountered increased competition from substitutes, which has reduced the growth rate of tungsten consumption in the United States; this substitution is expected to continue. Analysts believe that growth in tungsten consumption will depend on development of new uses for the metal, particularly in the electronics sector. 1/

Cutting tools, die parts, and wear-resistant material collectively represent the major end use for tungsten products; APT is facing declining consumption in this area. Substitution for cemented tungsten carbide in the manufacture of cutting tools is possible with ceramic, cermet, polycrystalline diamond, cubic boron nitride, silicon-aluminum nitride, and cemented titanium carbide. Also, coatings developed by the carbide industry have increased the life of metal tools and machinery by as much as 300 to 400 percent. Consumption of cemented tungsten carbide by U.S. firms peaked in 1981 and has fluctuated downward during the period of this investigation, as shown in the following tabulation: 2/

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1/ Information on consumption of tungsten obtained principally from Tungsten, supplement to American Metal Market, Feb. 6, 1985, pp. 4A, 5A, and 12A.

2/ As reported by the Cemented Carbide Producers Association. Data exclude production of direct armament components.

| Year | 1,000 pounds of cemented tungsten carbide sintered |
|---|---|
| 1981 | 15,676 |
| 1982 | 9,996 |
| 1983 | 7,806 |
| 1984 | 11,157 |
| 1985 | 10,040 |
| 1986 | 8,887 |

As plastics and other products replace steel in many durable goods, demand for tungsten carbide products will continue to decline. Substitution for tungsten in the production of wear-resistant materials and die parts is less likely.

Substitution for tungsten carbide drill bits has generally not occurred and is it not expected to do so. However, oil and gas exploration and development has been depressed during the period of this investigation because of low energy prices. Drilling activity declined from an average of 3,970 rigs in operation during 1981 to an average of 2,230 in 1983, rose slightly in 1984, then declined to an average of 1,980 in 1985. The number of rigs in operation reached a low point of some 660 in mid-July 1986; drilling activity has risen slightly since then.

Another important end use for APT is in mill products and specialty steel. Molybdenum, chromium, and cobalt may be substituted for tungsten in some of these applications, but industry sources suggest that end users have taken advantage of most opportunities for such substitution. Increased substitution for tungsten in these areas will depend on the abundance and price stability of the other products relative to tungsten; currently, such incentives for substitution do not exist.

In heavy metal applications, such as in counterweights for aircraft and armor piercing projectile cores, depleted uranium is a very effective substitute for tungsten. Conversely, there are no viable substitutes for tungsten wire in incandescent light bulbs and other electric applications, and tungsten parts in high-temperature furnaces.

Consumption of APT, presented in table 1, is considered by the industry to have been depressed during much of the period of investigation. Demand for tungsten products peaked during 1978-81. This boom is explained in large part by the surge in oil and gas drilling and expanded coal production that followed rising energy prices. Demand then fell sharply in 1982-83 as energy exploration declined and the recession led to decreased industrial and mining activity. APT consumption recovered substantially in 1984, reportedly because of the increased use of road repair equipment and a rise in coal production. Consumption of APT in 1984 approximated 85 percent of the 1981 level. Demand for APT fell again in both 1985 and 1986, again largely because of the sharp decline in oil and gas exploration.

Since U.S. producers reported no appreciable sales of tungstic acid, noncaptive consumption of this product approximates imports. 1/ U.S. imports of tungstic acid from all sources rose from 1,000 lbs W in 1982 and 1983 to 435,000 lbs W in 1984, declined to 348,000 lbs W in 1985, and then declined to 345,000 lbs W in 1986.

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1/ It should be noted that the preponderance of imports of tungstic acid is further processed into APT.

Table 1.--APT: U.S. consumption, production, and yearend inventories, 1982-86

(In thousands of pounds of tungsten content)

| Item | 1982 | 1983 | 1984 | 1985 | 1986 |
|---|---|---|---|---|---|
| U.S. consumption | 12,947 | 12,467 | 19,418 | 17,507 | 14,275 |
| U.S. production | 10,833 | 11,069 | 16,180 | 14,389 | 12,355 |
| Yearend inventories 1/ | 1,649 | 2,138 | 2,626 | 2,328 | 1,032 |
| Imports from-- | | | | | |
| China | 941 | 385 | 1,588 | 2,483 | 2,114 |
| All other countries | 732 | 1,311 | 997 | 495 | 434 |
| Total imports | 1,673 | 1,696 | 2,585 | 2,978 | 2,548 |

1/ Consumer and producer stocks.

Sources: Consumption, production, and yearend inventories from Bureau of Mines Minerals Yearbook, 1982, 1983, 1984, 1985, and "Tungsten in December 1986," Mineral Industry Surveys, U.S. Department of the Interior; import statistics from the U.S. Department of Commerce.

Note.--Consumption figures cannot be calculated from the data given because importers' and traders' inventories are not included.

## Consideration of Alleged Material Injury to an Industry in the United States

The information presented in this section of the report was obtained from responses to questionnaires of the U.S. International Trade Commission. All U.S. producers of APT responded to the questionnaire in this investigation. These producers reported no production per se of tungstic acid; all such material was processed into APT. Thus, no data on tungstic acid are presented in this section of the report.

### U.S. producers' capacity, production, and capacity utilization

According to questionnaire responses, U.S. capacity to produce APT increased over the period of investigation by 2.8 percent, from around 24.6 million lbs W in 1982 to 25.3 million lbs W in 1986 (table 2). Noncaptive

Table 2.--APT: U.S. capacity, production, and capacity utilization, 1982-86

| Year | Capacity | Production | Capacity utilization |
|---|---|---|---|
| | --1,000 pounds of tungsten content-- | | Percent |
| 1982 | 24,577 | 10,520 | 42.8 |
| 1983 | 25,847 | 11,962 | 46.3 |
| 1984 | 25,005 | 19,355 | 77.4 |
| 1985 | 25,719 | 15,244 | 59.3 |
| 1986 | 25,274 | 11,531 | 45.6 |

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

producers expanded their APT capacity somewhat * * * than did captive producers during 1982-86. 1/ Capacity increases during the period were attributable to equipment and plant modifications at * * *. * * *. Capacity rose by 5.2 percent from 1982 to 1983. A 3.3-percent decline in capacity occurred from 1983 to 1984 * * *. Capacity rose again, by 2.9 percent, from 1984 to 1985 and then declined 1.7 percent from 1985 to 1986 * * *.

U.S. production of APT as reported in questionnaire responses rose from 10.5 million lbs W in 1982 to 12.0 million lbs W in 1983, or by 14 percent, and increased again to 19.4 million lbs W in 1984, representing a 62-percent rise. Production then declined by 21 percent to 15.2 million lbs W in 1985 and fell again, by 24 percent to 11.5 million lbs W in 1986. Data on U.S. production of APT are also available from the Bureau of Mines (shown in table 1). The two sets of data show similar trends although the questionnaire data show greater shifts in each year.

Producers were asked to report separately their production for toll conversion fees and their production for internal consumption or sale. Toll conversion production * * *, as shown in the following tabulation:

* * * * * * *

Production for internal consumption or for sale, therefore, still rose slightly overall but declined somewhat relative to total production.

Utilization of productive capacity by U.S. producers of APT followed trends in production, with increases in 1983 and 1984 and decreases in 1985 and 1986. Capacity utilization ranged from a low of 43 percent in 1982 to a high of 77 percent in 1984. Capacity utilization fell to 46 percent in 1986. Capacity utilization trends of noncaptive and captive producers were * * *.

U.S. producers' shipments

U.S. producers' total shipments for sale or internal consumption (excludes toll conversions) of APT show a 16-percent rise in terms of volume during the period of investigation, as presented in table 3. Such shipments fell by 12 percent from 1982 to 1983 and then more than doubled from 1983 to 1984. These shipments fell again by 18 percent from 1984 to 1985 and by 21 percent from 1985 to 1986.

In comparison to total shipments, intracompany shipments declined less sharply from 1982 to 1983 and from 1984 to 1986, and thus experienced an overall increase of 30 percent during 1982-86. Domestic shipments, meanwhile, experienced a smaller increase from 1983 to 1984 than did total or intracompany shipments and suffered sharper declines in every other year of the investigation for an overall decline of 5 percent during 1982-86. These different trends may be largely explained by the fact that APT consumers tend to rely more on available internal sources, and reduce outside purchases, when demand for tungsten powders and end products declines. Generally, intracompany shipments are more insulated from market fluctuations than are domestic shipments.

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1/ For purposes of this and subsequent comparisons, * * * are considered to be noncaptive producers and * * * are considered to be captive producers. * * *.

Table 3.--APT: U.S. producers' shipments, 1982-86 1/

(In thousands of pounds of tungsten content)

| Year | Intracompany shipments | Domestic shipments | Export shipments | Total |
|---|---|---|---|---|
| | Quantity (1,000 pounds of tungsten content) | | | |
| 1982 | 5,591 | *** | *** | 8,375 |
| 1983 | 5,045 | *** | *** | 7,356 |
| 1984 | 10,372 | *** | *** | 15,103 |
| 1985 | 8,766 | *** | *** | 12,303 |
| 1986 | 7,248 | *** | *** | 9,746 |
| | Value (1,000 dollars) | | | |
| 1982 | 46,289 | *** | *** | 71,103 |
| 1983 | 34,981 | *** | *** | 52,951 |
| 1984 | 57,897 | *** | *** | 89,077 |
| 1985 | 49,299 | *** | *** | 72,800 |
| 1986 | 34,678 | *** | *** | 49,343 |
| | Unit value (Per pound of tungsten content) | | | |
| 1982 | $8.28 | $8.94 | *** | $8.49 |
| 1983 | 6.93 | 7.76 | *** | 7.20 |
| 1984 | 5.58 | 6.60 | *** | 5.90 |
| 1985 | 5.62 | 6.65 | *** | 5.92 |
| 1986 | 4.78 | 5.87 | *** | 5.06 |

1/ Excludes toll conversions.

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.

In terms of value, total U.S. shipments of APT fell by 31 percent during the period of investigation. The value of shipments declined by 26 percent from 1982 to 1983, then rose by 68 percent from 1983 to 1984. Shipments declined in value by 18 percent from 1984 to 1985, and by another 32 percent from 1985 to 1986. The values of intracompany and domestic shipments fluctuated comparably during 1982-84; however, domestic shipments fell more rapidly in value than did intracompany shipments during 1984-86.

The unit value of total shipments fell overall by 40 percent although those of intracompany shipments declined somewhat more than did those of domestic shipments. From 1984 to 1985, unit values rose by less than 1 percent; in every other year of the investigation, domestic, intracompany, and total shipments unit values declined.

U.S. producers' inventories

Data on U.S. producers' and consumers' yearend inventories, available from the Bureau of Mines, are presented in table 1. These data show that

inventory levels rose from 1982 to 1984 and declined from 1984 to 1986, for an overall decline during the period of investigation of 37 percent. Comparable figures are not available for shipments. Questionnaire data for yearend inventories of U.S.-produced APT, presented in table 4, show that these inventories, as a percent of total shipments, peaked in 1983, declined in 1984, and rose again from 1984 to 1986.

Table 4.--APT: U.S. producers' yearend inventories and shipments, 1982-86

| Year | Inventories | Total shipments | Ratio of inventories to shipments |
|---|---|---|---|
| | ---1,000 pounds of tungsten content--- | | Percent |
| 1982 | 2,171 | 8,375 | 25.9 |
| 1983 | 2,985 | 7,356 | 40.6 |
| 1984 | 3,289 | 15,103 | 21.8 |
| 1985 | 2,839 | 12,303 | 23.1 |
| 1986 | 2,818 | 9,746 | 28.9 |

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

Employment

According to questionnaire data, the number of production and related workers engaged in the production of APT declined only slightly from 1982 to 1984 but fell sharply from 1984 to 1986 for an overall decrease of 31 percent during the period of investigation (table 5). Hours worked by such workers

Table 5.--APT: Average number of production and related workers, hours worked by such workers, productivity, wages and total compensation paid, and unit labor costs, 1982-86

| Item | 1982 | 1983 | 1984 | 1985 | 1986 |
|---|---|---|---|---|---|
| Number of workers | 195 | 194 | 193 | 178 | 135 |
| Hours worked.....thousands | 369 | 374 | 388 | 331 | 250 |
| Productivity | | | | | |
| lbs W per hour | 29 | 32 | 50 | 46 | 46 |
| Wages paid-- | | | | | |
| Total.....1,000 dollars | 3,601 | 3,833 | 4,145 | 3,690 | 2,917 |
| Hourly | $9.76 | $10.25 | $10.68 | $11.16 | $11.67 |
| Total compensation paid-- | | | | | |
| Total.....1,000 dollars | 4,509 | 4,791 | 5,325 | 4,657 | 3,627 |
| Hourly | $12.22 | $12.81 | $13.72 | $14.08 | $14.51 |
| Unit labor costs..per lb W | $0.43 | $0.40 | $0.28 | $0.31 | $0.31 |

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

experienced a similar overall decline although they rose marginally from 1982 to 1984. Wages and total compensation paid also rose from 1982 to 1984 but fell overall by 19 percent and 20 percent, respectively. Hourly wages and total hourly compensation, on the other hand, rose each year with overall increases of 20 percent and 19 percent, respectively. Productivity improved sharply during 1982-84, and fell slightly in 1985. * * * cited * * * during 1982-84 and layoffs in 1985-86 as an explanation of increased productivity. * * *. Unit labor costs dropped sharply from 1982 to 1984, but increased somewhat from 1984 to 1986, for an overall decline of 27 percent. * * * employees are not represented by a union; * * * workers are unionized.

* * * reported that it shut down APT production on * * * occasions during the period of investigation: * * *. These reductions of production and related workers producing APT were attributed to * * *. * * * laid off * * * because of * * *. * * * more employees permanently lost jobs in * * * when * * *. * * * cited * * * for the following employment reductions:

* * * * * * *

Financial experience of U.S. producers

* * * U.S. producers, * * *, furnished income-and-loss data for their operations producing APT. These firms accounted for * * * of total U.S. APT production in 1986 and for * * * of U.S. noncaptive shipments in that year. * * *. Four firms, * * *, supplied income-and-loss data for their overall establishments within which APT is produced. Such establishment operations represent their total tungsten operations.

APT operations.--Total net sales of APT fell by 18 percent from * * * in 1982 to * * * in 1983, peaked at * * * in 1984 and then dropped to * * * in 1986, representing a decline of 57 percent (table 6). Trade net sales showed a similar trend, declining by 32 percent from 1982 to 1983, peaking at * * * in 1984, and then dropping by 62 percent from 1984 to 1986. Sales for a conversion fee rose from * * * in 1982 to * * * in 1984, representing an increase of 49 percent, and then declined by 38 percent to * * * in 1986.

U.S. producers reported aggregate gross losses throughout the period of investigation. Such losses increased from * * * (16.4 percent of net sales) in 1982 to * * * (22.6 percent of net sales) in 1983, and then dropped to their lowest level of * * * (3.3 percent of net sales) in 1984, when sales of APT peaked. As sales declined, the gross losses rose to * * * (10.6 percent of net sales) in 1985 and peaked at * * * (33.8 percent of net sales) in 1986. The operating losses were highest at about * * * during 1982-83 because of higher general, selling, and administrative (GS&A) expenses, both in absolute dollars as well as in relation to net sales. As GS&A expenses declined, the operating losses also declined during 1984-86, compared with those in 1982-83. The operating loss margins followed a trend similar to that of gross loss margins, increasing to 51.1 percent in 1983 from 39.5 percent in 1982, dropping to 15.2 percent in 1984, and rising again to 22.5 percent in 1985 and 48.0 percent in 1986.

Table 6.--Income-and-loss data of U.S. producers 1/ on their APT operations, accounting years 1982-86

| Item | 1982 | 1983 | 1984 | 1985 | 1986 |
|---|---|---|---|---|---|
| Net sales: | | | | | |
| Trade.....1,000 dollars.. | *** | *** | *** | *** | *** |
| For a conversion fee.....do.... | *** | *** | *** | *** | *** |
| Intra/intercompany transfers 1,000 dollars.. | *** | *** | *** | *** | *** |
| Total net sales.....do.... | *** | *** | *** | *** | *** |
| Cost of goods sold.....do.... | *** | *** | *** | *** | *** |
| Gross profit or (loss).....do.... | *** | *** | *** | *** | *** |
| General, selling, and administrative expenses 2/...1,000 dollars.. | *** | *** | *** | *** | *** |
| Operating income or (loss)....do.... | *** | *** | *** | *** | *** |
| Interest expense.....do.... | *** | *** | *** | *** | *** |
| Other income or (expense), net 1,000 dollars.. | *** | *** | *** | *** | *** |
| Net income or (loss) before income taxes.....do.... | *** | *** | *** | *** | *** |
| Depreciation, amortization, and depletion expense included above 1,000 dollars.. | *** | *** | *** | *** | *** |
| Cash-flow or (deficit) from operations 3/.....do.... | *** | *** | *** | *** | *** |
| As a share of net sales: | | | | | |
| Gross profit or (loss)...percent.. | (16.4) | (22.6) | (3.3) | (10.6) | (33.8) |
| Operating income or (loss) percent.. | (39.5) | (51.1) | (15.2) | (22.5) | (48.0) |
| Net income or (loss) before income taxes.....do.... | (39.7) | (52.7) | (15.9) | (23.3) | (59.2) |
| Cost of goods sold.....do.... | 116.4 | 122.6 | 103.3 | 110.6 | 133.8 |
| General, selling, and administrative expenses...do.... | 23.2 | 28.5 | 11.9 | 11.9 | 14.2 |
| Number of firms reporting-- | | | | | |
| Operating losses..... | *** | *** | *** | *** | *** |
| Net losses..... | *** | *** | *** | *** | *** |

1/ These firms are * * *.
2/ * * *.
3/ Defined as pretax net income or loss plus depreciation, amortization, and depletion expense.

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

The key financial data of each firm are presented in table 7. * * *.

* * * * * * *

Table 7.--Selected income-and-loss data of U.S. producers 1/ on their APT operations, by firms, accounting years 1982-86

| Item | 1982 | 1983 | 1984 | 1985 | 1986 |
|---|---|---|---|---|---|
| Net sales: | | | | | |
| Trade: | | | | | |
| ***.....1,000 dollars.. | *** | *** | *** | *** | *** |
| Total.....do.... | *** | *** | *** | *** | *** |
| For a conversion fee: | | | | | |
| ***.....do.... | *** | *** | *** | *** | *** |
| Total.....do.... | *** | *** | *** | *** | *** |
| Intra/intercompany transfers: | | | | | |
| ***.....do.... | *** | *** | *** | *** | *** |
| Total.....do.... | *** | *** | *** | *** | *** |
| Total net sales: | | | | | |
| ***.....do.... | *** | *** | *** | *** | *** |
| Total.....do.... | *** | *** | *** | *** | *** |
| Gross profit or (loss): | | | | | |
| ***.....do.... | *** | *** | *** | *** | *** |
| Total.....do.... | *** | *** | *** | *** | *** |
| Operating income or (loss) | | | | | |
| ***.....do.... | *** | *** | *** | *** | *** |
| Total.....do.... | *** | *** | *** | *** | *** |
| Ratio to total net sales: | | | | | |
| Gross profit or (loss): | | | | | |
| ***.....percent.. | *** | *** | *** | *** | *** |
| Weighted-average....do.... | (16.4) | (22.6) | (3.3) | (10.6) | (33.8) |
| Operating income or (loss): | | | | | |
| ***.....percent.. | *** | *** | *** | *** | *** |
| Weighted-average....do.... | (39.5) | (51.1) | (15.2) | (22.5) | (48.0) |

1/ Includes * * *.

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

* * * convert tungsten ore concentrates into APT for other firms for a fee. Income-and-loss data related to their conversion operations are presented in table 8. * * *.

* * * * * * *

Table 8.--Income-and-loss data of U.S. producers on their APT conversion operations, by firm, accounting years 1982-86

* * * * * * *

Unit conversion revenues, costs, and gross profit or loss, by firms, are presented in table 9. * * *. The conversion costs per lb W fluctuated during 1982-86 on the basis of the firms' total volume of APT production. Producers appear to have more control in establishing conversion fees where they provide services only; such fees are not directly affected by declining prices of ore concentrates.

Table 9.--APT: Unit conversion revenues, costs, and gross profit or loss, by firms, accounting years 1982-86

* * * * * * *

Average revenue, cost of sales, and gross profit or loss per lb W, excluding conversion operations, are presented in table 10. This table also shows the unit value of intracompany transfers of APT for further processing by each firm. * * *. The weighted-average trade unit sales value declined from $9.14 per lb W in 1982 to $4.85 per lb W in 1986, or by 47 percent. The weighted-average unit cost of sales also declined but not in the same proportion as trade unit sales value, dropping by 40 percent from $9.67 per lb W in 1982 to $5.81 per lb W in 1986.

Table 10.--APT: Average unit sales value, cost of sales, and gross profit or loss, by firms, accounting years 1982-86

(Per pound of tungsten content)

| Item | 1982 | 1983 | 1984 | 1985 | 1986 |
|---|---|---|---|---|---|
| Average unit sales value: | | | | | |
| Trade: | | | | | |
| ***..... | *** | *** | *** | *** | *** |
| Weighted-average..... | $9.14 | $7.05 | $6.79 | $6.81 | $4.85 |
| Intracompany/intercompany transfers: 1/ | | | | | |
| ***..... | *** | *** | *** | *** | *** |
| Weighted-average..... | 8.60 | 8.00 | 5.96 | 5.96 | 5.00 |
| Average unit cost of sales: | | | | | |
| ***..... | *** | *** | *** | *** | *** |
| Weighted-average..... | 9.67 | 8.74 | 6.70 | 6.75 | 5.81 |
| Average unit gross profit or (loss): | | | | | |
| ***..... | *** | *** | *** | *** | *** |
| Weighted-average..... | (2.10) | (2.55) | (.76) | (1.10) | (2.39) |

1/ * * *.

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

Overall establishment operations.--The income-and-loss data for four U.S. producers' establishments in which APT is produced are shown in table 11. As mentioned earlier, such establishment operations represent these firms' total tungsten operations. Total net sales of tungsten products declined by 23 percent, from $137.5 million in 1982 to $106.3 million in 1983. Such sales peaked at $172.9 million in 1984 and then dropped to $126.5 million in 1986. * * *. * * * transfer their tungsten products at market price, whereas * * * transfers at cost. * * *.

Table 11.--Income-and-loss data of U.S. producers 1/ on the overall operations of their establishments within which APT is produced, accounting years 1982-86

| Item | 1982 | 1983 | 1984 | 1985 | 1986 | |
|---|---|---|---|---|---|---|
| Net sales: | | | | | | |
| Trade.....1,000 dollars.. | *** | *** | *** | *** | *** | |
| Intracompany/intercompany transfers.....do.... | *** | *** | *** | *** | *** | |
| Total net sales.....do.... | 137,479 | 106,276 | 172,864 | 153,254 | 126,462 | |
| Cost of goods sold.....do.... | 113,396 | 94,340 | 144,354 | 129,012 | 104,990 | 2/ |
| Gross profit or (loss).....do.... | 24,083 | 11,936 | 28,510 | 24,242 | 21,472 | |
| General, selling, and administrative expenses 3/..1,000 dollars.. | 15,391 | 15,940 | 14,960 | 13,992 | 13,272 | |
| Operating income or (loss)...do.... | 8,692 | (4,004) | 13,550 | 10,250 | 8,200 | |
| Interest expense.....do.... | 2,075 | 1,869 | 2,079 | 1,603 | 2,771 | 4/ |
| Other income or (expense), net 1,000 dollars.. | (1,702) | (3,305) | (2,428) | (1,009) | (2,814) | 5/ |
| Net income or (loss) before income taxes.....do.... | 4,915 | (9,178) | 9,043 | 7,638 | 2,615 | |
| Depreciation, amortization, and depletion expense included above 1,000 dollars.. | 7,474 | 6,696 | 8,055 | 8,042 | 5,832 | |
| Cash-flow or (deficit) from operations 6/.....do.... | 12,389 | (2,482) | 17,098 | 15,680 | 8,447 | |
| As a share of net sales: | | | | | | |
| Gross profit or (loss)..percent.. | 17.5 | 11.2 | 16.5 | 15.8 | 17.0 | |
| Operating income or (loss) percent.. | 6.3 | (3.8) | 7.8 | 6.7 | 6.5 | |
| Net income or (loss) before income taxes.....do.... | 3.6 | (8.6) | 5.2 | 5.0 | 2.1 | |
| Cost of goods sold.....do.... | 82.5 | 88.8 | 83.5 | 84.2 | 83.0 | |
| General, selling, and administrative expenses..do.... | 11.2 | 15.0 | 8.7 | 9.1 | 10.5 | |
| Number of firms reporting operating and net losses..... | *** | *** | *** | *** | *** | |

1/ The firms are * * *.
2/ * * *.
3/ * * *.
4/ * * *.
5/ * * *.
6/ Defined as pretax net income or loss plus depreciation, amortization, and depletion expense.

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

U.S. producers reported operating losses of $4.0 million, or 3.8 percent of net sales, in 1983, compared with an operating income of $8.7 million, or 6.3 percent of net sales, in 1982. Operating income peaked at $13.6 million, equivalent to 7.8 percent of net sales, in 1984. Such income then dropped to $10.3 million, or 6.7 percent of net sales, in 1985 and to $8.2 million, or 6.5 percent of net sales, in 1986.

* * * provided partial income-and-loss data on its overall establishment operations, but on a different basis from that used by the other producers. Hence, its data are not included in the aggregate data but are presented in the following tabulation (in thousands of dollars):

* * * * * * *

Li Tungsten filed for bankruptcy under chapter 11 on July 26, 1985, and completely suspended manufacturing activities * * *. The firm produced intermediate tungsten products such as APT, as well as tungsten carbide powder. * * *.

Investment in productive facilities.--Four U.S. producers provided data concerning their investment in productive facilities used in production of all products within APT establishments as well as for APT. These data are presented in table 12.

Table 12.--APT: Investment in productive facilities by 4 U.S. producers, as of the end of accounting years 1982-86

(In thousands of dollars)

| Item | 1982 | 1983 | 1984 | 1985 | 1986 |
|---|---|---|---|---|---|
| All products of establishments: | | | | | |
| Original cost 1/ | 144,377 | 144,527 | 148,230 | 150,498 | 132,167 |
| Book value | 103,770 | 101,321 | 98,637 | 94,632 | 89,487 |
| APT: | | | | | |
| Original cost 1/ | 58,821 | 57,122 | 58,711 | 59,680 | *** |
| Book value | 37,078 | 35,170 | 32,660 | 30,652 | 28,405 |

1/ * * * did not provide the original cost of its investments.

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

Aggregate investment in property, plant, and equipment used in the production of APT, valued at cost, remained between $57.1 million and $59.7 million during 1982-85, but declined to * * * in 1986. The major reason for this decline is * * *. The book value of investments by the four firms dropped steadily from $37.1 million in 1982 to $28.4 million in 1986.

Capital expenditures and research and development expenses.--Five firms furnished data relative to their capital expenditures for land and land improvements, buildings, and machinery, equipment, and fixtures used in production of all products within APT establishments as well as for APT.

As shown in table 13, capital expenditures related to APT production declined from * * * in 1982 to $1.3 million in 1983 and then rose to $1.8 million in 1984. Such expenditures fell to $905,000 in 1985 before increasing to $1.1 million in 1986. The high level of capital expenditures in 1982 reflects * * *. Overall establishment capital expenditures showed a similar trend as that related to APT production.

Table 13.--U.S. producers' capital expenditures, by types and by products, 1982-86

(In thousands of dollars)

| Item | 1982 | 1983 | 1984 | 1985 | 1986 |
|---|---|---|---|---|---|
| All products of establishments: | | | | | |
| Land and land improvements | *** | *** | *** | *** | *** |
| Building or leasehold improvements | *** | *** | *** | *** | *** |
| Machinery, equipment, and fixtures | 8,611 | 4,450 | 4,850 | 4,375 | 3,818 |
| Total | 9,366 | 4,708 | 5,167 | 4,810 | 4,150 |
| APT: | | | | | |
| Land and land improvements | *** | *** | *** | *** | *** |
| Building or leasehold improvements | *** | *** | *** | *** | *** |
| Machinery, equipment, and fixtures | *** | 1,216 | 1,741 | 872 | 979 |
| Total | *** | 1,262 | 1,845 | 905 | 1,083 |

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

* * * * * * *

Capital and investment.--The Commission requested U.S. producers to describe and explain the actual and potential negative effects, if any, of imports of APT from China on their firms' growth, investment, and ability to raise capital. Their responses are presented below.

* * * * * * *

## The Question of the Threat of Material Injury 1/

### U.S. importers' inventories

A number of importers of Chinese APT reported that they bought the product out of bonded warehouses * * * from traders and had it converted by * * * into tungsten powders; thus, these importers held no inventories of APT. In fact only * * * reported holding significant inventories. Inventory levels * * * (table 14). Inventories of Chinese APT represented * * *. Other products held in bonded warehouses may be excluded from these data; however, only * * * has been specifically identified by industry spokesmen as holding inventories.

1/ Additional information on threat is presented in the section of this report entitled "Consideration of the Causal Relationship Between Alleged Material Injury or the Threat Thereof and the Allegedly Rapidly Increasing Imports."

Table 14.--APT: Importers' yearend inventories and shipments of the product imported from China, 1982-86

| Year | Importers' yearend inventories | Importers' shipments | Ratio of inventories to shipments |
|---|---|---|---|
| | ---1,000 pounds of tungsten content--- | | Percent |
| 1982 | *** | 1,188 | *** |
| 1983 | *** | 1,298 | *** |
| 1984 | *** | 1,926 | *** |
| 1985 | *** | 2,403 | *** |
| 1986 | *** | 3,050 | *** |

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

The foreign industry and its capacity to generate exports

The RMA contends that the Chinese flooded world markets with APT at a time when demand was depressed, and that China can be expected to continue such policies. Counsel for respondents maintains that Chinese officials have made repeated good faith efforts to respond to U.S. and world concerns about tungsten supplies and, likewise, can be expected to continue to manage its trade in a responsible manner.

Counsel for the Chinese respondents was requested by staff to compile data on capacity, production, home-market shipments, inventories, and exports to the United States and third-country markets for tungsten ore concentrates, APT, tungstic acid, and other important tungsten intermediates. Only selected export data were provided by respondents. Commissioners subsequently directed questions to a representative of the Chinese industry at the hearing and made requests for data on Chinese capacity, production, and exports of tungsten products. The following additional data were received: a flowsheet describing the production of tungstic acid in China, several published analyses of the Chinese tungsten industry, and "recent" figures for noncaptive capacity, production, and consumption of Chinese APT and tungstic acid. Respondents also described administrative and policy changes made by the Chinese regarding exports of tungsten products to the United States. Other requested data were reported by respondents to be unavailable. Available information on the Chinese tungsten industry is presented below.

Unless otherwise noted, the following information is taken from The Economics of Tungsten, 1986, a study conducted by a British consulting firm specializing in metals and mining industries, which serves as a major source of data on foreign tungsten industries for the U.S. Bureau of Mines. Chinese reserves are estimated to be about one-third of the known world reserves of tungsten (other estimates are as high as one-half), and China is believed to be the world's largest producer of tungsten ore, accounting for, again, one-third of the total. Development of these resources lagged behind much of the non-Communist bloc, but Western tungsten experts visited a Chinese mine in 1979 and reported the industry to be well developed. Production is being expanded in line with national industrialization plans. China is integrating downstream tungsten production in order to supply domestic demand and other Communist bloc nations and to increase the value of its exports. China is believed to have nine APT plants; counsel for respondents specifies that

* * * factories in southern and central China produce the product for export. The RMA identified eight plants in its posthearing brief and noted that such a list is incomplete. Respondents report that noncaptive Chinese APT capacity was 18 million pounds and the RMA alleges that capacity of the plants they identified was 13 million lbs W, citing China National Nonferrous Metals Import and Export Corp. (CNIEC) as a source. A Swedish firm is reportedly engaged in modernizing a cemented carbide factory in China, and Japan assisted in the construction of two filament plants to have been completed in 1984.

Respondents included the paper "Discussions of the Sessional Working Group," dated August 12, 1986, prepared for the November 1986 meeting of the United Nations Conference on Trade and Development (UNCTAD) Committee on Tungsten, as exhibit 4 of their posthearing brief. 1/ The paper made the following observations regarding the Chinese tungsten industry:

> In recent years, shipments from China have undergone a significant change brought about by both internal and external factors. Among the internal factors are the shift of productive capabilities from defense to civilian use, the decentralization of responsibility leading to greater autonomy at company levels in both management and sales, change in foreign-trade policy leading to increased trade flows not only in volume but also in the wider range of products, and the devaluation of the renminbi (Chinese currency unit) in terms of the United States dollar and other major currencies. The availability of cheap domestic material appears to have further stimulated the production of processed products. As regards external factors, the lower international price for concentrates provides further incentives to export tungsten in the form of processed products rather than in ores and concentrates ....
>
> Consequently, there has been an increase in the availability of Chinese intermediate products which are able to compete on the world market.... According to rough estimates based mainly on trade statistics provided by importing countries, shipments of Chinese intermediate products amounted to some 500 to 1,000 metric tons in 1980, rising to 1,000-1,500 metric tons in 1981 and 1982. But there was a substantial setback in 1983 when Chinese shipments reached probably no more than around 500 metric tons, owing to low levels of demand in major consuming countries resulting from an extremely weak market situation. The recovery in industrial activity in 1984 led to a sharp increase in Chinese shipments estimated to total between 2,000 and 2,500 metric tons. There was a further rise of Chinese shipments in 1985 due mainly to an increase of imports of Chinese ammonium paratungstate into the United States. The United States imports of the latter material rose to over a thousand metric tons compared to 720 metric tons in 1984. However, China remains predominantly an exporter of concentrates. The highest proportion reached by Chinese shipments of intermediate products in relation to concentrates, estimated at around 25 percent, was attained in 1982 when there was a sharp cutback in Chinese material. With the relatively low proportion of its present shipments of intermediate products in relation to its primary exports, China is a country with a substantial potential for expansion of its export trade in processed products.

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1/ U.S. State Department sources described UNCTAD data to Commission staff as the best available source of information on the Chinese tungsten industry.

Counsel for respondents, however, asserts that most APT is consumed domestically and specifies that noncaptive production of APT and tungstic acid was 6,600 tons each in a recent year, with a capacity utilization rate for noncaptive APT production of 75 percent. Three-fourths of the tungstic acid produced for the noncaptive market was consumed in the home market. Reported consumption of APT in China accounted for one-half of total noncaptive production; exports accounted for the remainder. Exports from China to major markets of "tungsten salts" during 1984-86 are presented in the following tabulation (gross weight in metric tons): 1/

* * * * * * *

A Japanese trader, quoted in U.S. tungsten industry press reports, estimated that Chinese production of tungsten peaked in 1980 at 15,000 tons W and varied from 11,500 to 13,500 tons W during 1981-85. He also noted that Chinese exports of APT during 1981-85 ranged from a low of 5,300 tons W in 1982 to a high of 12,000 tons W in 1983. China reportedly exported 75 percent of the APT it produced in 1984. The Japanese source also estimated exports of Chinese APT to have been 6,000 tons W in 1985 (of which 10 percent went to Japan), and projected a slight increase in 1986. 2/

Also, according to U.S. metals industries' press reports, analysts blame competition among Chinese entities for declines in world tungsten prices during 1981-82, and again following a decentralization of Chinese tungsten export sales in 1984. The authors of The Economics of Tungsten, 1986 observed that the China National Metals and Minerals Import and Export Corp. (Minmetals) controlled exports of ores and concentrates, the China Metallurgical Products Import and Export Corp. (CMIEC) controlled exports of downstream products such as APT and tungsten powder, and that CNIEC appeared to be targeted to take control of all export sales of tungsten products. Respondents explain that CNIEC took over export sales of APT in mid-1983, when it was created, and that these sales were required to be above a certain floor price. Whereas prior to 1982 China was expanding its concentrate sales, there was a shift toward APT exports in 1984 (see fig. 2). Counsel for respondents explain that CNIEC's monopoly on export sales of APT was relaxed in late 1984 in the face of rising world demand. In March 1986, as a result of the RMA petition to the USTR, a U.S. delegation traveled to China to discuss APT trade. Subsequently, respondents maintain, China centralized export sales and restricted exports to Hong Kong, resulting in a decline in exports in 1986 from that of the previous year. The RMA contends, however, that Chinese exports continued to rise through July-September 1986, and after a drop during October-December 1986, surged in early 1987. Importers report that shipments from China arrive 2 to 4 months after an order has been placed; this may account for some delay in the decline of import levels. 3/ The RMA reintroduced its petition in November 1986, and further informal governmental contacts were made in February 1987. Chinese officials informed the USTR that

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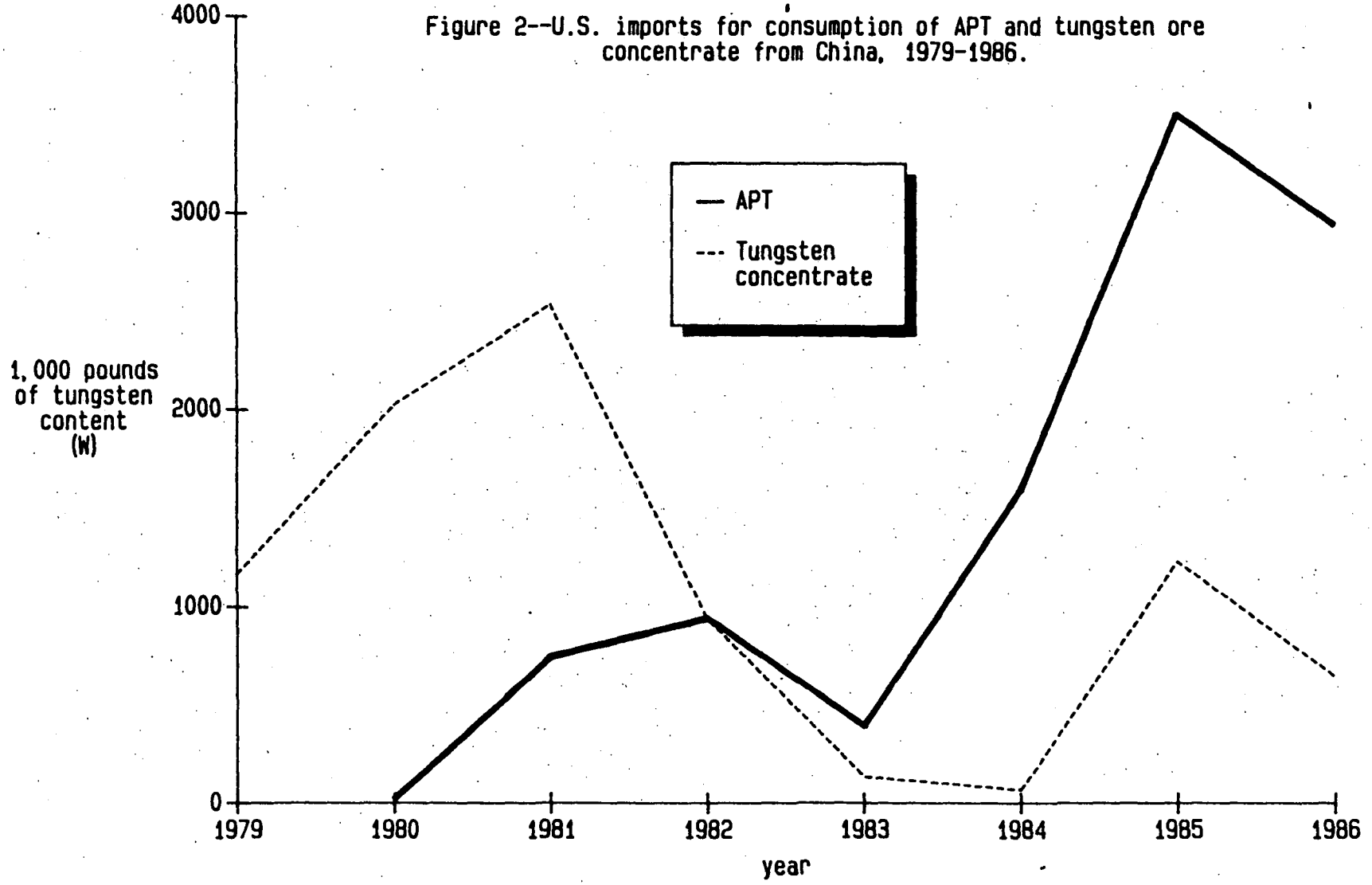
1/ Provided by counsel for respondents from Chinese Customs Statistics. Tungsten salts include APT, tungstic acid, tungstic oxide, and other unspecified intermediate tungsten products. Contained weight of tungsten cannot be calculated from available information.

2/ "Tungsten," Supplement to American Metal Market, Jan. 22, 1987, p. 4A.

3/ Quarterly import data are presented in the section entitled "The Question of the Rapidly Increasing Imports From China."

Figure 2--U.S. imports for consumption of APT and tungsten ore concentrate from China, 1979-1986.




Source: U.S. Bureau of Mines and U.S. Bureau of Census.

only CNIEC and Minmetals were licensed to sell APT and that export prices and quantities would be controlled for individual foreign markets. In a March 1987 American Metal Market article, a vice president at CNIEC is described as saying that an imbalance in the world market developed because of China's multiple exporting channels and that China was taking steps to centralize export sales.

## Consideration of the Causal Relationship Between Alleged Material Injury or the Threat Thereof and the Allegedly Rapidly Increasing Imports

### U.S. imports

In terms of volume, U.S. imports of APT from all countries rose by 52 percent from 1982 to 1986, rising from 1.7 million lbs W to 2.5 million lbs W (table 15). Imports rose by 1 percent from 1982 to 1983, by 52 percent from 1983 to 1984, and by 15 percent from 1984 to 1985. Total imports then declined by 14 percent from 1985 to 1986.

Imports of tungstic acid from all sources totaled only 1,000 lbs W in both 1982 and 1983, and increased to 435,000 lbs W in 1984. Tungstic acid imports fell by 20 percent in 1985 and remained nearly constant, at 345,000 lbs W in 1986.

U.S. imports of APT from all sources declined in value by 17 percent from 1982 to 1986. Imports of APT fell from $15.1 million in 1982 to $11.1 million in 1983, and rose back up to $15.3 million in 1984. These imports rose again in value, by 24 percent, from 1984 to 1985, but fell 34 percent from 1985 to 1986, from $19.0 million to $12.5 million.

The value of U.S. imports of tungstic acid totaled $16,000 in 1982 and $9,000 in 1983. These imports then rose to $2.0 million in 1984. The value of tungstic acid imports declined by 34 percent from 1984 to 1985 and then rose by 1 percent from 1985 to 1986, to a total of $1.3 million.

### The question of the rapidly increasing imports from China

Import data on Chinese APT are available from various sources. Inaccuracies are believed to exist in each source, as described below. This report will refer to official import statistics for calculation of market penetration; however, other data will be presented.

Imports from China under TSUS items 416.40 and 417.40 are not known to include products other than those subject to investigation. Thus, the official Commerce statistics, when revised from errata information, contain no identifiable bias toward overstatement. However, industry press reports have cited, and respondents have acknowledged, that Chinese APT has been shipped via export companies in Hong Kong. Although material of Chinese origin should be classified as imported from China regardless of port of shipment, the large quantities of APT * * * imported into the United States from Hong Kong, particularly in 1985, suggest that some material may have been misclassified and thus official statistics may be understated. Also, 1985 and 1986 data on tungstic acid give contained weights that are too close to the gross weights for this product; the RMA suggests that some tungstic oxide, which has a much

Table 15.--APT and tungstic acid: U.S. imports for consumption, from China and other selected sources, 1980-86

| Source | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 |
|---|---|---|---|---|---|---|---|
| | Quantity (1,000 pounds of tungsten content) | | | | | | |
| APT: | | | | | | | |
| China 1/..... | 23 | 743 | 941 | 385 | 1,588 | 2,483 | 2,114 |
| West Germany.... | 153 | 49 | 192 | 115 | 57 | 72 | 289 |
| Korea..... | 132 | 215 | 483 | 967 | 784 | 255 | 106 |
| Taiwan..... | 2/ | - | - | - | - | 26 | 26 |
| Hong Kong..... | - | - | - | - | 55 | 139 | 10 |
| All other..... | 137 | 39 | 57 | 230 | 99 | 3 | 3 |
| Total..... | 446 | 1,046 | 1,673 | 1,696 | 2,585 | 2,978 | 2,548 |
| Tungstic acid: | | | | | | | |
| China..... | - | - | - | - | 434 | 348 | 345 |
| All other..... | 2/ | - | 1 | 1 | 2 | 2/ | - |
| Total..... | 2/ | - | 1 | 1 | 435 | 348 | 345 |
| | Value (1,000 dollars) 3/ | | | | | | |
| APT: | | | | | | | |
| China 1/..... | 244 | 7,530 | 8,145 | 2,872 | 9,424 | 14,983 | 9,960 |
| West Germany.... | 1,635 | 505 | 1,973 | 1,003 | 446 | 505 | 1,817 |
| Korea..... | 1,510 | 2,231 | 4,458 | 5,697 | 4,541 | 1,582 | 558 |
| Taiwan..... | 4/ | - | - | - | - | 150 | 121 |
| Hong Kong..... | - | - | - | - | 266 | 1,755 | 50 |
| All other..... | 1,453 | 422 | 482 | 1,534 | 588 | 21 | 16 |
| Total..... | 4,843 | 10,688 | 15,058 | 11,106 | 15,266 | 18,996 | 12,521 |
| Tungstic acid: | | | | | | | |
| China..... | - | - | - | - | 2,014 | 1,328 | 1,341 |
| All other..... | 4/ | - | 16 | 9 | 12 | 2 | - |
| Total..... | 4/ | - | 16 | 9 | 2,026 | 1,330 | 1,341 |
| | Unit value (Per pound of tungsten content) | | | | | | |
| APT: | | | | | | | |
| China 1/..... | $10.57 | $10.13 | $8.66 | $7.47 | $5.93 | $6.03 | $4.71 |
| West Germany.... | 10.70 | 10.31 | 10.28 | 8.72 | 7.82 | 7.00 | 6.29 |
| Korea..... | 11.40 | 10.38 | 9.23 | 5.89 | 5.79 | 6.20 | 5.26 |
| Taiwan..... | 5/ | - | - | - | - | 5.77 | 4.65 |
| Hong Kong..... | - | - | - | - | 4.84 | 12.63 | 5.00 |
| All other..... | 10.61 | 10.82 | 8.46 | 6.67 | 5.94 | 7.00 | 5.33 |
| Average..... | 10.87 | 10.22 | 9.00 | 6.55 | 5.90 | 6.38 | 4.91 |
| Tungstic acid: | | | | | | | |
| China..... | - | - | - | - | $4.64 | $3.82 | $3.89 |
| All other..... | 5/ | - | $16.00 | $9.00 | 6.00 | 5/ | - |
| Average..... | 5/ | - | 16.00 | 9.00 | 4.66 | 3.82 | 3.89 |

1/ The United States began importing APT from China in 1980.
2/ Less than 500 lbs.
3/ C.i.f. value plus calculated duties.
4/ Less than $500.
5/ Cannot be calculated with available data.

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

higher tungsten content, may enter under tariff item 416.40. Chinese exports of the subject products to the United States, as reported by counsel for respondents, follow trends * * * to those of Commerce official statistics.

China began exporting APT to the United States in 1980, the year in which it was granted MFN treatment. China has been the principal source of imports of APT during most of the period of investigation (1982-86), with the Federal Republic of Germany (West Germany) and the Republic of Korea (Korea) being the other important foreign suppliers. In 1983, Korea was the major foreign supplier of APT, followed by China. The shares by volume of total imports from these countries during 1980-86 are shown in the following tabulation (in percent): 1/

| Source | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 |
|---|---|---|---|---|---|---|---|
| China | 5.2 | 71.0 | 56.3 | 22.7 | 61.4 | 83.3 | 83.0 |
| Korea | 29.8 | 20.6 | 28.8 | 57.0 | 30.3 | 8.6 | 4.2 |
| West Germany | 34.3 | 4.7 | 11.5 | 6.8 | 2.2 | 2.4 | 11.3 |
| All other | 30.7 | 3.7 | 3.4 | 13.6 | 6.0 | 5.6 | 1.5 |
| Total 1/ | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

1/ Because of rounding, figures may not add to the totals shown.

China began exporting tungstic acid to the United States in 1984 and accounted for over 99 percent of U.S. imports of that product during 1984-86.

According to the official statistics, imports of APT from China more than doubled in volume during 1982-86. These imports fell from 941,000 lbs W in 1982 to 385,000 lbs W in 1983, representing a 59-percent decline. Imports then rose threefold from 1983 to 1984 and increased by 56 percent from 1984 to 1985. Imports in 1986 totaled 2.1 million lbs W, representing a 15-percent decline compared with those of the previous year but almost three times the 1981 level of imports. The United States imported 434,000 lbs W of tungstic acid from China in 1984. These imports declined by 20 percent in 1985 and leveled off at 345,000 lbs W in 1986.

The value of APT imports from China rose by 22 percent during 1982-86 and the volume more than doubled. Imports from China totaled $8.1 million in 1982 and then fell to $2.9 million in 1983. The value of imports tripled from 1983 to 1984 and rose by another 59 percent from 1984 to 1985. The value of 1986 imports of APT from China was 34 percent below the value of such imports in the preceding year. The value of imports of tungstic acid from China fell 34 percent from 1984 to 1985 and then increased slightly from 1985 to 1986.

Quarterly import data reveal that imports of APT from China increased from 1.6 million lbs W in the first 10 quarters of 1982-86 (January 1982-June 1984) to 5.9 million lbs W in the last 10 quarters of the period (July 1984-December 1986). Similarly, imports of tungstic acid from China rose from 100,000 lbs W in the first half of 1982-86 to 1.0 million lbs W in the second half of the period, as shown in the following tabulation, compiled from official Commerce statistics (in thousands of lbs W):

---

1/ * * *.

| Year | Jan.-Mar. | | Apr.-June | | July-Sept. | | Oct.-Dec. | |
|---|---|---|---|---|---|---|---|---|
| | APT | Tungstic acid | APT | Tungstic acid | APT | Tungstic acid | APT | Tungstic acid |
| 1982..... | 348 | - | 232 | - | 285 | - | 76 | - |
| 1983..... | 91 | - | 57 | - | 237 | - | 1/ | - |
| 1984..... | 141 | 100 | 172 | - | 861 | 223 | 415 | 110 |
| 1985..... | 431 | - | 823 | 91 | 738 | 225 | 491 | 32 |
| 1986..... | 470 | - | 438 | 202 | 713 | 73 | 494 | 71 |

1/ Less than 500 pounds.

Following negotiations between U.S. and Chinese officials in March 1986, imports rose from April-June 1986 to July-September 1986 and declined during October-December 1986 but remained above the level of January-March 1986.

During January-March 1987, imports of APT from China totaled 899,000 lbs W, an increase of 91 percent compared with the 470,000 lbs W imported during January-March 1986. The value of these imports rose by 31 percent, from $2.7 million in the first three months of 1986 to $3.6 million in the corresponding months of 1987. The unit value of these imports fell by 32 percent. No tungstic acid was imported from China during January-March 1986; 167,000 lbs W of the product was imported during January-March 1987, with a value of $439,000.

Official statistics have recently been revised to include a "thirteenth month" of data; these December "bulge" data are not included in 1986 official import statistics although they include imports during that year. Previously, bulge data were included in the following year's import totals. Adding the thirteenth month to 1986 data would overstate imports during 1986 as such totals also include 1985 imports that were excluded from official statistics in that year. The quantity of APT imported from China during 1986 that is included in the thirteenth month data is 276,000 lbs W, valued at $304,000.

Aggregated U.S. imports of APT and tungstic acid from China rose one and one-half times from 1982 to 1986. Such imports totaled 941,000 lbs W in 1982 and fell by 59 percent to 385,000 lbs W in 1983. Aggregated imports of the subject products then rose fourfold to 2.0 million lbs W in 1984. From 1984 to 1985, imports rose again, by 40 percent, to 2.8 million lbs W. Imports declined to 2.5 million lbs W in 1986, representing a 13-percent drop.

Imports as reported in questionnaire responses differ significantly from official statistics. Coverage of known importers of the products under investigation is 100 percent in 1985-86 and almost that for 1982-84. These data may, however, be flawed in several ways. 1/ Imports of APT and tungstic acid, as reported by questionnaire respondents, are presented in the following tabulation (in thousands of lbs W): 2/

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1/ See app. G for an explanation of sources of error in questionnaire data.

2/ * * * was unable to break out tungstic acid data from APT data; thus, its imports of these products are included in APT.

| Year | APT | Tungstic acid |
|---|---|---|
| 1982 | 1,358 | *** |
| 1983 | 945 | *** |
| 1984 | 2,010 | *** |
| 1985 | 2,743 | *** |
| 1986 | 2,754 | *** |

Counsel for respondents provided the following estimates of Chinese exports of APT, tungstic acid, and other tungsten intermediates to the United States during 1984-86 (in thousands of pounds):

* * * * * * *

Rate of increase of imports from China relative to U.S. production

China established itself as the primary foreign supplier of APT to the United States after obtaining MFN treatment on February 1, 1980. In 1982, imports from China represented 8.9 percent of U.S. production as reported in questionnaire responses. This ratio fell to 3.2 percent in 1983 as imports from China declined sharply. In 1984, as U.S. output and consumption increased, imports from China rose more quickly and totaled 8.2 percent of domestic production. The RMA petition was submitted to the USTR in late 1985, a year in which the subject imports represented 16.3 percent of U.S. production. In 1986, this ratio rose somewhat to 18.3 percent.

Market penetration by imports from China

In terms of quantity, the share of the U.S. market for APT supplied by imports from all sources increased from 12.9 percent in 1982 to 17.8 percent in 1986, rising steadily except in 1984 when it fell to 13.3 percent (table 16). The share of the U.S. market supplied by APT from China increased from 7.3 percent in 1982 to 14.8 percent in 1986. The share of the market held by the Chinese dropped to its lowest level, 3.2 percent, in 1983, and rose each year after that. Market penetration by imports of tungstic acid

Table 16.--APT: Shares of U.S. consumption supplied by China, all other countries, and U.S. producers, 1982-86

| Item | 1982 | 1983 | 1984 | 1985 | 1986 |
|---|---|---|---|---|---|
| U.S. consumption.....1,000 lbs W.. | 12,947 | 12,467 | 19,418 | 17,507 | 14,275 |
| Share of U.S. consumption supplied by-- | | | | | |
| China.....percent.. | 7.3 | 3.2 | 8.2 | 14.2 | 14.8 |
| All other countries.....do.... | 5.7 | 11.0 | 5.1 | 2.8 | 3.0 |
| Subtotal.....do.... | 12.9 | 14.2 | 13.3 | 17.0 | 17.8 |
| U.S. producers.....do.... | 87.1 | 85.8 | 86.7 | 83.0 | 82.2 |
| Total.....do.... | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Source: Consumption figures obtained from the U.S. Bureau of Mines. Imports based on official statistics of the U.S. Department of Commerce and revisions thereof.

from China cannot be determined as information on U.S. consumption of tungstic acid is not available.

The share of the noncaptive U.S. APT market 1/ held by imports of APT from China nearly doubled during 1982-86 as shown in the following tabulation (based on questionnaire data and official import statistics):

| Year | Noncaptive market (1,000 lbs W) | Share of imports from China (percent) |
|---|---|---|
| 1982..... | 5,177 | 18.2 |
| 1983..... | 6,557 | 5.9 |
| 1984..... | 10,067 | 15.8 |
| 1985..... | 8,850 | 28.1 |
| 1986..... | 6,428 | 32.9 |

Apparent consumption of APT by value may be calculated on the basis of questionnaire data and official import statistics. In terms of value, market penetration of imports of APT from China fell from 1982 to 1983 and rose from 1983 to 1984 by about the same amount (table 17). As a share of the U.S. market, the value of imports from China increased again from 1984 to 1985 and declined slightly from 1985 to 1986. Market penetration trends measured in terms of volume and value were similar from 1982 to 1985, although fluctuations in volume were generally more pronounced. However, from 1985 to 1986, the market share of imports from China rose in terms of quantity and declined in terms of value because of the sharp decline in the unit value of the imports.

Table 17.--APT: Shares of U.S. apparent consumption, by value, supplied by China, all other countries, and U.S. producers, 1982-86

| Item | 1982 | 1983 | 1984 | 1985 | 1986 |
|---|---|---|---|---|---|
| Apparent U.S. consumption | | | | | |
| 1,000 dollars.. | 84,824 | 63,806 | 103,213 | 91,329 | 61,865 |
| Share of U.S. consumption supplied by-- | | | | | |
| China.....percent.. | 9.6 | 4.5 | 9.1 | 16.4 | 16.1 |
| All other countries.....do.... | 8.2 | 12.9 | 5.7 | 4.4 | 4.1 |
| Subtotal.....do.... | 17.8 | 17.4 | 14.8 | 20.8 | 20.2 |
| U.S. producers.....do.... | 82.2 | 82.6 | 85.2 | 79.2 | 79.8 |
| Total.....do.... | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Source: Apparent consumption compiled from questionnaire data and official import statistics. Imports based on official statistics of the U.S. Department of Commerce and revisions thereof.

Finally, according to questionnaire data and official import statistics, the share of the noncaptive U.S. APT market, in terms of value, held by imports of APT from China rose sharply during 1983-86 as shown in the following tabulation:

1/ Includes U.S producers' domestic and conversion shipments plus imports.

| Year | Noncaptive market (1,000 dollars) | Share of imports from China (percent) |
|---|---|---|
| 1982..... | 44,045 | 18.5 |
| 1983..... | 34,162 | 8.4 |
| 1984..... | 53,396 | 17.6 |
| 1985..... | 48,711 | 30.8 |
| 1986..... | 28,766 | 34.6 |

GSA stockpile sales

Respondents and purchasers, as well as several published sources, have alleged that GSA sales of tungsten ore concentrates from the National Defense Stockpile have had a disruptive effect on the market price for both concentrate and intermediate products such as APT. 1/

For more than 20 years, the GSA has sold excess inventory from the National Defense Stockpile, in the form of monthly offerings. According to the Strategic and Critical Materials Stock Piling Act (Public Law 96-41, 50 U.S.C. 98 et seq.) selling off of excess inventory from the stockpile is to be carried out though formal advertising or competitive negotiation procedures. 2/ In addition, the Act stated that "efforts shall be made in the acquisition and disposal of such materials to avoid undue disruption of the usual markets of producers, processors, and consumers of such materials...." 3/

Prior to 1984, limits varied as to the volume of ore concentrate that could be offered for sale. Complaints by both domestic and foreign producers led to the 1984 Defense Authorization Act, which limited the quantity of concentrate offered by the GSA. According to a spokesperson for the GSA, Congress authorizes the maximum amount of ore concentrate, in lbs W, that the GSA can sell from the stockpile. This amount varies, however, from law to law. The GSA has an internally imposed a restriction of 300,000 lbs W per month that they offer for sale. 4/ Recent allegations that the GSA has suspended sales of tungsten concentrates are untrue. The Federal Emergency Management Agency (FEMA) has proposed to Congress that the quantities of tungsten sold by the GSA be reduced, but no official action had occurred as of the time of this report. 5/

Through December 1986, the GSA offered an ongoing invitation for purchasers to bid on a price-competitive basis, with the GSA opening bids once per month. Awards were made monthly, up to a ceiling of 300,000 lbs W. In December 1986, the GSA established a new procedure in which the main feature is a barter system in which two ferroalloy upgraders, MacAlloy and Elkem,

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1/ See Mesher, Frances Kramer, and James C. Burrows, "On the Economics of the Tungsten Market," in Economics of Internationally Traded Materials, William R. Bush, ed., Mar. 1986. Also, Waller, Jocelyn, "The Outlook for Tungsten," Metal Bulletin Monthly, Mar. 1986. Conversations with George Freeman, Kennametal, Mar. 25, 1987, and Robert Bunting, Stratcor, Mar. 27, 1987.

2/ Stockpile Report to the Congress, Oct. 1985-Mar. 1986, Federal Emergency Management Agency (FEMA), No. 36, Oct. 1986, p. 43.

3/ Ibid.

4/ Conversation with Cheryl Deister, May 11, 1987.

5/ Ibid.

receive tungsten ore concentrates in partial payment for upgrading ferroalloys for the GSA. Tungsten concentrate is only one of a number of materials offered in this payment through materials program.

Price ranges for 44 GSA sales during the 1980-87 period are presented in table 18. Comparing the GSA bid range with world market prices as quoted in the London Metal Bulletin (LMB), GSA bid ranges were at or below the LMB quote in one-half of the reported transactions.

Table 18.--Tungsten ore concentrate: Domestic sales by the General Services Administration, price range of bids, and London Metals Bulletin price quotations, by specified months of bid tender, January 1980-February 1987

| Date of bid tender | Quantity sold | Price range of bids | LMB Mid 1/ |
|---|---|---|---|
| | Pounds W | Per stu | |
| 1980: | | | |
| January | 196,144 | $126.59 - $130.16 | $127 |
| February | 549,183 | 127.51 - 132.21 | 128 |
| March | 102,030 | 132.21 - 132.77 | 133 |
| April | 94,300 | 130.17 - 130.17 | 131 |
| May | 149,537 | 128.05 - 128.19 | 128 |
| June | 84,598 | 128.37 - 130.86 | 129 |
| July | 42,334 | 133.24 - 133.24 | 132 |
| November | 330,004 | 124.32 - 127.91 | 128 |
| December | 324,575 | 126.78 - 128.36 | 127 |
| Total | 2,016,454 | - | - |
| 1981: | | | |
| January | 314,181 | 133.71 - 134.77 | 133 |
| February | 128,443 | 137.48 - 139.26 | 137 |
| March | 27,944 | 138.20 - 138.20 | 138 |
| April | 351,223 | 130.78 - 132.91 | 133 |
| May | 162,029 | 129.03 - 130.23 | 130 |
| June | 223,245 | 132.80 - 133.84 | 133 |
| August | 57,893 | 128.43 - 128.43 | 133 |
| September | 61,616 | 125.21 - 125.21 | 131 |
| October | 192,184 | 120.26 - 121.21 | 124 |
| Total | 1,518,758 | - | - |
| 1982: | | | |
| April | 84,474 | 92.66 - 93.77 | 94 |
| May | 133,984 | 97.65 - 99.65 | 99 |
| Total | 218,708 | - | - |
| 1983: | | | |
| July | 29,747 | 72.66 - 72.66 | 74 |
| August | 208,640 | 68.15 - 70.78 | 68 |
| September | 51,597 | 74.84 - 74.84 | 72 |
| October | 322,062 | 62.66 - 68.95 | 73 |
| Total | 612,046 | - | - |

Table 18.--Tungsten ore concentrate: Domestic sales by the General Services Administration, price range of bids, and London Metals Bulletin price quotations, by specified months of bid tender, January 1980-February 1987--continued

| Date of bid tender | Quantity sold | Price range of bids | LMB Mid 1/ |
|---|---|---|---|
| | Pounds W | Per stu | |
| 1984: | | | |
| January | 428,357 | $68.66 - $71.54 | $68 |
| February | 421,708 | 69.40 - 72.77 | 69 |
| March | 396,755 | 71.11 - 79.58 | 74 |
| April | 229,255 | 80.23 - 81.20 | 77 |
| May | 127,303 | 79.35 - 80.55 | 79 |
| June | 56,422 | 77.14 - 77.14 | 79 |
| July | 126,546 | 72.05 - 82.36 | 74 |
| August | 315,772 | 74.89 - 76.20 | 72 |
| September | 254,990 | 76.29 - 80.09 | 76 |
| December | 195,918 | 60.80 - 61.70 | 67 |
| Total | 2,553,025 | - | - |
| 1985: | | | |
| January | 360,751 | 56.88 - 60.32 | 62 |
| February | 32,475 | 69.27 - 69.27 | 66 |
| April | 56,404 | 62.50 - 62.50 | 67 |
| May | 88,892 | 58.29 - 58.29 | 62 |
| June | 301,496 | 54.89 - 56.89 | 57 |
| July | 71,528 | 51.02 - 54.49 | 59 |
| August | 314,165 | 54.53 - 62.11 | 61 |
| September | 209,788 | 58.95 - 61.39 | 63 |
| Total | 1,436,004 | - | - |
| 1986: | | | |
| July | 89,745 | 32.00 - 42.77 | 47 |
| Total | 89,745 | - | - |
| 1987: | | | |
| February | 17,591 | 31.35 - 31.35 | 39 |
| Total | 17,591 | - | - |

1/ Weighted-average midpoint price determined from the low and high price quotation range published biweekly in the London Metal Bulletin.

Source: Office of National Defense Stockpile, Stockpile Contracts Division.

Prices

Demand for APT and tungstic acid is a derived demand based on demand for cutting, drilling, machining, and die tools as well as end products in oil drilling and mining applications, electrical products, and armaments. Tungsten ore concentrate is a major input in the final production of APT, 1/

1/ * * *.

and historically, prices for tungsten concentrates and APT have shown a relatively constant relationship. 1/

Tungsten ore concentrate prices are quoted semi-weekly in the LMB, weekly in Metals Week, and twice monthly in the International Tungsten Indicator (ITI). The LMB quotations are for both wolframite and scheelite, 2/ based on actual transaction prices reported by producers, traders, and purchasers. The LMB quotations are published as a high-low range, for wolframite concentrate graded at 65 percent $WO_3$ or higher, and scheelite at 70 percent $WO_3$ or higher. The ITI quotes take into account both wolframite and scheelite concentrates, and both spot and long-term contract prices. Metals Week quotes also include tungsten concentrates with more than 65 percent $WO_3$, but cover fewer transactions than the two previous reports, and are not often used for determining prices of APT. 3/

Until the mid-1980's, APT price quotes were based on the world market price for tungsten concentrates, generally the LMB midpoint average (LMB mid), 4/ divided by a yield loss factor of 96 percent, plus conversion fees. 5/ The LMB mid is generally the average of LMB quotes in the month prior to the month of the quote. APT can be bought either on long-term contracts (usually annual), on the spot market, or through short-term negotiated contracts. A quote in May would be based on the April LMB mid quote. Spot-market quotes, on the other hand, are based on the most recent LMB quote, and long-term contracts are generally based on the LMB quote at the time of each shipment during the year. Conversion fees are involved in all transactions and include the costs associated with processing tungsten concentrates into APT or other intermediate tungsten products and the seller's markup.

* * * reported that they continue to base APT prices on the LMB price quotation formula. * * * indicated that long- and short-term contracts are based on LMB + conversion fees, and on spot-market quotations. For these three domestic producers, average conversion margins were * * * per stu in 1982 and had decreased to * * * by 1986. Counsel for the Chinese manufacturers report that a 1983 policy enacted by the Chinese Government established a floor price for all export sales of APT, denying export licenses to those enterprises in China selling below this price. 6/ The policy required that all Chinese APT would be priced at LMB mid plus a minimum conversion factor of * * *. 7/ Counsel stated that the Chinese Government recently raised this floor conversion margin to * * *. 8/ * * * reported conversion fees ranging from * * * to * * *, delivered duty-paid, for Chinese material during 1982-86, and * * * reported a conversion fee of * * * for Chinese APT in 1986. A long-term contract negotiated by * * *.

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1/ No prices were reported by U.S. producers on sales of tungstic acid, which ordinarily is further processed into APT before being sold. Limited pricing data were reported by one importer and one purchaser.

2/ Prior to 1984, price quotations were only for wolframite.

3/ Anstett, T.F., Tungsten availability-market economy countries, U.S. Department of the Interior, 1985.

4/ LMB mid is the weighted-average midpoint price determined from the low and high price quotation range published biweekly in the London Metal Bulletin.

5/ A typical price formula would be: APT price in dollars per metric (short) ton unit $WO_3$ = LMB/0.96 + conversion fee.

6/ Prehearing brief of respondents, p. 3.

7/ Ibid, p. 36.

8/ * * *.

The Bureau of Mines reported that APT prices began decreasing during the latter half of 1981, after having remained relatively stable since 1978. Average quarterly prices for APT moved between $165 and $173 per stu in 1980, rose to $174 per stu during the first quarter of 1981, and then declined to $130 by the end of 1982. 1/ According to a Stratcor official, these APT prices were the published prices of Union Carbide, which was the price leader until the early 1980's. Although APT prices were correlated with the LMB quotations, they did not move as frequently as the concentrate prices reported there. Since 1983, however, prices for both ore concentrate and APT have fluctuated frequently, and the Bureau of Mines suspended price quotes for APT in its annual reports in 1983 because of "the competitiveness in pricing for intermediate tungsten products." 2/

Currently, several industry participants, including producers, importers, and purchasers, agree that the formula to price APT based strictly on the LMB quotations is being used less frequently, with more prices being negotiated directly between sellers and buyers. Several purchasers argue that supplies of APT in the U.S. market increased as demand for final products decreased or remained flat because of sharp declines in oil exploration, improvements in the cutting tool and machining industry to prolong the life of newly manufactured tools, and the introduction of substitutes such as depleted uranium in the defense industry. One purchaser, * * *, indicated that purchases of APT in that company are down * * * from that in 1981 because of declines in oil drilling. In regard to depleted uranium, the RMA reports that trends are shifting back to tungsten for ordnance applications, and may soon reach 10 to 15 percent of total annual U.S. tungsten requirements. 3/

As with price, quality is an important factor when purchasing APT. Although inferior quality Chinese APT may have been an important issue when the product was first introduced to the U.S. market in 1980, industry sources agree that differences in quality are no longer as evident since the Chinese have improved the consistency of the quality of their exported product. Quality of APT is measured in terms of its density, grain size, and purity; customers' needs may vary with regard to these three characteristics, although producers and importers generally believe that domestic and Chinese APT are interchangeable for most uses. Some companies such as * * * have restrictive quality requirements for the APT used in the production of * * *.

Questionnaires were sent to all known producers, importers, and traders/brokers of APT and tungstic acid. Prices were requested for the largest monthly sale, based on either spot-market quotations or short-term contracts negotiated on the basis of the LMB formula, for the period January 1984-December 1986. Also requested were price terms for any long-term (annual) contracts during 1982-86. In addition, LMB mid quotations 4/ are presented to show trends in tungsten concentrate prices, since the world market price of tungsten is a major component of the price of intermediate products.

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1/ Bureau of Mines Mineral Yearbooks, 1980-1982, Tungsten, U.S. Department of the Interior.

2/ Bureau of Mines Mineral Yearbook 1982, Tungsten, U.S. Department of the Interior.

3/ Posthearing brief of the RMA, Appendix IX.

4/ Wolframite quotations in short ton units.

Three domestic producers, * * *, submitted prices for sales of APT during 1984-86. These three companies accounted for 100 percent of noncaptive shipments in 1986. * * *. Three importers of Chinese APT reported monthly prices, whereas two reported terms for long-term contracts. These importers accounted for 89 percent of non-end-user imports of APT from China in 1986. 1/

Although pricing data supplied in producer and importer questionnaires showed Chinese APT prices at times equal to, or higher than, prices received by domestic producers, responses to Commission purchaser questionnaires, as well as conversations with producers, importers, and purchasers, tend to indicate that the Chinese product has consistently been priced below the domestic producers' prices. One importer reported prices substantially higher than all other prices during September 1985 and January-February 1986. * * *. 2/

As shown in table 19, domestic producers' weighted-average monthly delivered prices increased by 12 percent from January 1984 to July 1984 or from * * * to * * * per stu, and then declined in a relatively steady pattern throughout the remainder of the 1984-86 period. Despite occasional, slight monthly price increases, prices never reached 1984 levels after that year, falling to * * * per stu by December 1986. Prices declined by 14 percent in 1985 and by 42 percent in 1986.

Prices for APT imported from China also trended downward, although there was more volatility than with the domestic producers' prices. Chinese prices peaked at * * * per stu in October 1984 and fell to * * * per stu by December 1986. Importers' weighted-average prices showed a decrease of 44 percent during January 1984-December 1986.

* * * * * * *

Since January 1987, producers and purchasers report that APT prices have risen. One purchaser, * * *, representing an increase of 21 percent. Producers that tie price quotes to LMB mid report that the April 28, 1987, LMB quote of $47.44 was 38 percent higher than the December 1986 mid quote of $34.34.

* * * * * * *

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1/ * * *.
2/ Conversation with * * *.

Table 19.--APT: Delivered weighted-average prices for domestic and Chinese APT, and London Metal Bulletin (LMB) tungsten ore concentrate midpoint average prices, January 1984-December 1986

(Per stu)

| Period | APT | | Tungsten ore concentrate |
|---|---|---|---|
| | U.S.-produced | Chinese | |
| 1984: | | | |
| January | *** | *** | $67.70 |
| February | *** | *** | 69.29 |
| March | *** | *** | 73.94 |
| April | *** | *** | 77.18 |
| May | *** | *** | 78.70 |
| June | *** | *** | 78.67 |
| July | *** | *** | 73.73 |
| August | *** | *** | 72.01 |
| September | *** | *** | 76.32 |
| October | *** | *** | 76.66 |
| November | *** | *** | 72.22 |
| December | *** | *** | 67.20 |
| 1985: | | | |
| January | *** | *** | 62.49 |
| February | *** | *** | 66.22 |
| March | *** | *** | 68.70 |
| April | *** | *** | 67.48 |
| May | *** | *** | 61.69 |
| June | *** | *** | 57.10 |
| July | *** | *** | 58.56 |
| August | *** | *** | 61.29 |
| September | *** | *** | 62.77 |
| October | *** | *** | 60.08 |
| November | *** | *** | 56.80 |
| December | *** | *** | 54.39 |
| 1986: | | | |
| January | *** | *** | 52.72 |
| February | *** | *** | 53.52 |
| March | *** | *** | 50.69 |
| April | *** | *** | 47.29 |
| May | *** | *** | 46.72 |
| June | *** | *** | 46.72 |
| July | *** | *** | 44.91 |
| August | *** | *** | 39.86 |
| September | *** | *** | 34.67 |
| October | *** | *** | 31.11 |
| November | *** | *** | 33.00 |
| December | *** | *** | 34.34 |

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

Purchaser responses.--Eleven purchasers of APT, as well as one purchaser of tungstic acid, responded to Commission questionnaires. These 11 purchasers accounted for 40 percent of apparent U.S. consumption in 1986. Six purchasers reported data for Chinese APT, accounting for 98 percent of 1986 imports.

Purchasers reported quarterly delivered prices for purchases of domestic and Chinese APT (table 20). Weighted-average prices indicate that prices fell for both domestic and Chinese APT, with the U.S. product showing an overall decline of 28 percent and the Chinese product a decline of 48 percent during 1984-86. With the exception of one purchaser, all agreed that Chinese APT has been available at a price lower than that of domestic APT by up to $10 per stu. Margins of underselling showed the Chinese product priced below the domestic product in all quarters, with margins ranging from less than 1 percent to 28 percent. Margins were largest during the final two quarters of 1986.

Table 20.--APT: Purchasers' weighted-average delivered prices for domestic and Chinese APT and margins of underselling, by quarters, January 1984-December 1986

(Per short ton unit)

| Period | Purchasers | | Margins of underselling | |
|---|---|---|---|---|
| | U.S. APT | Chinese APT | Absolute | Percent |
| 1984: | | | | |
| January-March..... | *** | *** | $0.10 | 0.1 |
| April-June..... | *** | *** | 3.04 | 2.8 |
| July-September..... | *** | *** | 24.02 | 21.2 |
| October-December... | *** | *** | 13.84 | 12.7 |
| 1985: | | | | |
| January-March..... | *** | *** | 0.82 | 0.8 |
| April-June..... | *** | *** | 13.17 | 13.3 |
| July-September..... | *** | *** | 2.93 | 3.1 |
| October-December... | *** | *** | 5.01 | 5.4 |
| 1986: | | | | |
| January-March..... | *** | *** | 9.47 | 11.6 |
| April-June..... | *** | *** | 11.69 | 13.6 |
| July-September..... | *** | *** | 18.71 | 22.1 |
| October-December... | *** | *** | 20.17 | 27.6 |

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

Unit values for purchases of domestic and Chinese APT are presented in the following tabulation, compiled from purchasers' questionnaire responses (per pound of tungsten content):

| | 1982 | 1983 | 1984 | 1985 | 1986 |
|---|---|---|---|---|---|
| United States.... | $8.74 | $7.31 | $6.62 | $6.04 | $4.87 |
| Chinese..... | 9.37 | 7.16 | 7.04 | 5.76 | 4.21 |

Of those purchasers that actually purchased Chinese APT, three agreed that the Chinese material is of comparable quality in terms of physical and chemical make-up. Two purchasers reported shipments of Chinese APT not meeting their physical specifications. One buyer commented that in terms of the chemical make-up of APT, the Chinese product is close to the domestic product, but in terms of the physical make-up, the Chinese APT is often too fine in its grain size. 1/ Packaging of the Chinese product is said to be bulky and inferior to that of the U.S. companies. * * * reports that Chinese APT is shipped in steel drums that are difficult to handle and dispose of. Domestic firms ship in cardboard drums that are larger than those of the Chinese.

Chinese APT has generally required longer lead times than does domestic APT. However, one purchaser noted that brokers and traders have helped to correct this situation by maintaining larger inventories in U.S. warehouses. Several purchasers commented that although they purchase APT, they never actually take possession of the product until it has been converted to tungsten carbides or powders. They stated that although their purchases of APT are shipped to a facility for conversion, they quite probably receive carbides or powders converted from APT already in stock, and their APT goes into this stock. Thus, they do not necessarily receive powders converted from the same APT that they purchased.

Two purchasers, Kennametal, Inc., and SinterMet, Inc., submitted letters outlining their positions with respect to this investigation (the letters are presented in app. H). Kennametal, a producer of tungsten powders and various end products, many defense-related, is in support of the petition. It indicated its concern about the survival of the U.S. APT industry, particularly the noncaptive sector, fearing dependence on captive APT producers and imports for their sourcing. Kennametal stated that alleged changes in sales practices on the part of the Chinese in March 1986 have not been evident in the marketplace, pointing out that it received offers of Chinese APT from several sources during the fourth quarter of 1986 at prices ranging from $50 to $52 per stu, delivered, duty paid. SinterMet is a manufacturer of tungsten carbide wear parts; exports have accounted for a major part of its business and for most of the firm's growth. SinterMet is concerned that any action taken to restrict availability of low-cost Chinese tungsten products will increase SinterMet's costs and reduce its competitiveness in the export market.

According to purchasers, APT prices are quoted both delivered and f.o.b., but transportation costs are not generally an important factor in purchase decisions in this industry. Such fees generally average less than 2 percent of the purchase price of the material.

## Exchange rates

Since the value of the currency of China, the yuan, is determined by the Chinese Government and not by the free market, meaningful measures of China's exchange rate cannot be presented.

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1/ Conversation with * * *.

Lost sales and lost revenues

Three producers of APT submitted allegations of instances in which either sales were lost, or prices were lowered, because of competition from APT imported from China. Fourteen purchasers were named in these allegations, * * *. Total quantity of lost revenues alleged by these three producers was approximately 111,000 stu, and lost sales involved about 329,000 stu. Total values of lost sales and lost revenues are not available because of differences in methods of reporting by the producers.

* * *.--* * * alleged * * *. * * * was not able to address these specific instances. * * *. * * * believed that the Chinese had a good quality product available for $5 to $10 per stu below the domestic price, adding that everyone in the industry uses a different price formula depending on the timing of the LMB.

* * *.--* * * cited * * *. * * *. * * * confirmed both allegations, adding that the purchase of Chinese APT was * * *. * * * commented that * * * never sees the APT since it is converted to powder before delivery, and believes that the APT * * * purchases is mixed with other purchasers' APT at the converters' facilities. * * * believes that until APT returns to the $70 to $90 per stu range, "no one will be happy."

* * *.--* * * alleged * * * it had to lower the charge for conversion of APT * * * to match an importer's competitive price. * * * did not comment on the allegation * * *. * * * believes that the biggest problem with the industry that manufactures tungsten products is that the market has shrunk because of declining demand, but too many firms remain in the market.

* * *.--* * * alleged * * * because of competition from Chinese APT. * * *. * * * was not able to comment on the specific allegations, but * * * did not recall purchasing any Chinese APT in * * *. * * * commented that they purchase through a trader and do not usually know the country of origin of the APT. Also, like many other purchasers, * * * does not actually take possession of the order until it has been converted to carbide powder. According to * * *, demand in their sector of the carbide field, the oil sector, is off * * *, and their purchases of APT are down * * *.

* * *.--* * * alleged * * *. * * * was not able to comment on the specific allegations. * * * did say, however, that since almost all materials in the market are interchangeable, purchase decisions are usually based on price. * * *.

* * *.--* * * cited * * * because of price competition from the Chinese. * * * denied the allegations. * * *. * * * because of the drop in the overall market price. * * * come into line with the world market price. * * *.

* * *.--* * * alleged * * *. * * *. * * * basing the purchase decision on the availability of duty drawbacks on exports of their final products. * * * were of domestic APT * * *. The * * * alleged by * * * was denied * * *. The * * * allegation was confirmed as to the price, but not * * *.

* * * alleged * * *. * * * confirmed that * * * reduced its price * * *, but * * * also had purchased domestic APT from * * *. * * * was denied since * * *.

* * *.--* * * alleged * * *. * * * stated that both allegations are true.

* * * * * * *

* * *.--* * * alleged * * *. * * * stated that * * * was not able to recall this particular instance, but that they have not purchased * * * at any one time in recent years. Responses to the Commission's purchaser questionnaire indicate that * * *. * * *.

* * *.--* * * alleged * * *. * * * would not comment on the specific allegations, referring the Commission instead to their purchaser questionnaire. Staff was not able to verify * * * from the submitted questionnaire although * * * purchased only Chinese APT during the period of the alleged * * * by * * *. * * *.

* * *.--* * * alleged * * *. * * * stated that * * * purchased only domestic APT, from * * *, during * * *. The quantity of these purchases totaled * * *. The APT produced by * * * was purchased for * * * per stu, and the * * * APT was purchased for * * * per stu. * * * commented that their only purchases of Chinese APT * * *.

# APPENDIX A

## REQUEST FROM THE UNITED STATES TRADE REPRESENTATIVE

THE UNITED STATES TRADE REPRESENTATIVE
WASHINGTON
20506

February 26, 1987

The Honorable Susan Liebeler
Chairman
U.S. International Trade Commission
Washington, D.C. 20436

Dear Chairman Liebeler:

In December 1985, the Refractory Metals Association (RMA), which represents domestic tungsten producers and consumers, submitted a petition under Section 406 (d)(1) of the Trade Act of 1974 alleging that imports of ammonium paratungstate(APT) and tungstic acid from the People's Republic of China (PRC) were disrupting the U.S. market. The petition requested that I ask the USITC to initiate an investigation under Section 406 (d)(1) to determine the validity of the RMA's allegations. I made a decision in January 1986 to initiate informal consultations with the PRC on the tungsten issue and the RMA agreed to hold its petition in abeyance pending the outcome of the consultations.

The RMA subsequently considered the consultations, which were held in March 1986, ineffective and reintroduced its petition last November. Although U.S. APT and tungstic acid imports from China declined last year from the 1985 level, they are still far above average levels of previous years. Moreover according to the RMA, Chinese prices for the two commodities have been erratic and relatively low compared to prices for tungsten ore.

To assist the Administration in determining a course of action in this matter, I am requesting, pursuant to section 406(a)(1) of the Trade Act of 1974, that the U.S. International Trade Commission conduct an investigation to determine with respect to imports of APT and tungstic acid from the PRC (provided for in items 416.40 and 417.40, respectively of the Tariff Schedules of the United States), whether market disruption exists with respect to the products of the U.S. industry.

Sincerely,

Clayton Yeutter

CY:Wew

# APPENDIX B

## THE FEDERAL REGISTER NOTICES

[Investigation No. TA-406-11]

## Ammonium Paratungstate and Tungstic Acid From the People's Republic of China; Import Investigation

**AGENCY:** United States International Trade Commission.

**ACTON:** Institution of an investigation under section 406(a) of the Trade Act of 1974 (19 U.S.C. 2436(a)) and scheduling of a public hearing in connection therewith.

**SUMMARY:** Following receipt on March 5, 1987, of a request from the United States Trade Representative, the United States International Trade Commission instituted investigation No. TA-406-11 under section 406(a) of the Trade Act of 1974 to determine, with respect to imports of ammonium paratungstate and tungstic acid from the People's Republic of China, provided for in items 471.40 and 416.40, respectively, of the Tariff Schedules of the United States, whether market disruption exists with respect to an article produced by a domestic industry. Section 406(e)(2) of the act defines such market disruption to exist whenever "imports of an article, like or directly competitive with an article produced by such domestic industry, are increasing rapidly, either absolutely or relatively, so as to be a significant cause of material injury, or threat thereof, to such domestic industry." The Commission will make its determination in this investigation by June 5, 1987.

**EFFECTIVE DATE:** March 5, 1987.

**FOR FURTHER INFORMATION CONTACT:** Rebecca Woodings (202-523-0282), Office of Investigations, U.S. International Trade Commission, 701 E Street, NW., Washington, DC 20436. Hearing-impaired individuals are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on 202-724-0002. Persons with mobility impairments who will need special assistance in gaining access to the Commission should contact the Office of the Secretary at 202-523-0161.

**SUPPLEMENTARY INFORMATION:**

*Participation in the investigation.*—Persons wishing to participate in the investigation as parties must file an entry of appearance with the Secretary to the Commission, as provided in § 201.11 of the Commission's rules (19 CFR 201.11), not later than twenty-one (21) days after publication of this notice in the **Federal Register**. Any entry of appearance filed after this date will be referred to the Chairman, who will determine whether to accept the late entry for good cause shown by the person desiring to file the entry.

*Service list.*—Pursuant to § 201.11(d) of the Commission's rules (19 CFR 201.11(d)), the Secretary will prepare a service list containing the names and addresses of all persons, or their representatives, wh are parties to this investigation upon the expiration of the period for filing entries of appearance. In accordance with § 201.16(c) of the rules (19 CFR 201.16(c)), each document filed by a party to the investigation must be served on all other parties to the investigation (as identified by the service list), and a certificate of service must accompany the document. The Secretary will not accept a document for filing without a certificate of service.

*Hearing.*—The Commission will hold a public hearing in connection with this investigation beginning at 9:30 a.m. on April 29, 1987, at the U.S. International Trade Commission Building, 701 E Street NW., Washington, DC. Requests to appear at the hearing should be filed in writing with the Secretary to the Commission not later than the close of business (5:15 p.m.) on April 17, 1987. All persons desiring to appear at the hearing and make oral presentations, with the exception of public officials and persons not represented by counsel, should file prehearing briefs and attend a prehearing conference to be held at 9:30 a.m. on April 22, 1987, in room 117 of the U.S. International Trade Commission Building. The deadline for filing prehearing briefs is April 23, 1987. Posthearing brief's must be submitted not later than the close of business on May 5, 1987. Confidential material should be filed in accordance with the procedures described below.

Parties are encouraged to limit their testimony at the hearing to a nonconfidential summary and analysis of material contained in prehearing briefs and to information not available at the time the prehearing brief was submitted. Any written materials submitted at the hearing must be filed in accordance with the procedures described below and any confidential materials must be submitted at least three (3) working days prior to the hearing (see § 201.6(b)(2) of the Commission's rules (19 CFR 201.6(b)(2))).

*Written submissions.*—As stated above, parties to this investigation may file prehearing and posthearing briefs by the dates shown above. In addition, any person who has not entered an appearance as a party to the investigation may submit a written statement of information pertinent to the subject of the investigation on or before May 5, 1987. A signed original and fourteen (14) copies of each submission must be filed with the Secretary to the Commission in accordance with § 201.8 of the Commission's rules (19 CFR 201.8). All written submissions except for confidential business data will be available for public inspection during regular business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary to the Commission.

Any business informaton for which confidential treatment is desired shall be submitted separately. The envelope and all pages of such submissions must be clearly labeled "Confidential Business Information." Confidential submissions and requests for confidential treatment must conform with the requirements of § 201.6 of the Commission's rules (19 CFR 201.6).

*Remedy.*—Parties are reminded that no separate hearing on the issue of remedy will be held. Those parties wishing to present arguments on the issue of remedy may do so orally at the hearing or in their prehearing or posthearing briefs or other written submissions.

For further information concerning the conduct of this investigation, hearing procedures, and rules of general application, consult the Commission's Rules of Practice and Procedure, Part 206, Subparts A and C (19 CFR Part 206), and Part 201, Subparts A through E (19 CFR Part 201).

By order of the Commission.

Issued: March 13, 1987.

Kenneth R. Mason,

*Secretary.*

[FR Doc. 87-5861 Filed 3-18-87; 8:45 am]

BILLING CODE 7020-02-M

**INTERNATIONAL TRADE COMMISSION**

**[Investigation No. TA-406-11]**

## Ammonium Paratungstate and Tungstic Acid From the People's Republic of China; Correction

**Correction**

In the Federal Register of Thursday, March 19, 1987, FR Doc. 87-5861, Summary, Line 10, "471.40" is changed to "417.40".

Issued: April 1, 1987.

By order of the Commission.

Kenneth R. Mason,

*Secretary.*

[FR Doc. 87-7792 Filed 4-7-87; 8:45 am]

BILLING CODE 7020-02-M

# APPENDIX C

## LIST OF WITNESSES

# CALENDAR OF PUBLIC HEARING

Those listed below appeared as witnesses at the United States International Trade Commission's hearing:

Subject: Ammonium Paratungstate and Tungstic Acid from the People's Republic of China

Inv. No.: TA-406-11

Date and time: April 29, 1987 - 9:30 a.m.

Sessions were held in connection with the investigation in the Hearing Room of the United States International Trade Commission, 701 E Street, N.W., in Washington.

In support of a finding of market disruption:

Blumenthal & Shanley--Counsel
Washington, D.C.
on behalf of

The Refractory Metals Association

Donald L. Bernens, President, Refractory Metals Association; Vice President, Administration, Teledyne Firth Sterling

Peter K. Johnson, Director, Refractory Metals Association

C. Canfield Clark, Manager, Business Planning, AMAX Business Products Division

William G. Beattie, President, Strategic Minerals Corp.

Robert N. Bunting, Marketing Manager, Strategic Minerals Corp.

John F. Fedorchak, Refractory Metal Products, GTE

Carol S. Blumenthal--OF COUNSEL

In opposition to a finding of market disruption:

Graham & James--Counsel
Washington, D.C.
on behalf of

China National Minerals & Metals Import & Export Corp. (Minmetals), China National Nonferrous Import & Export Corp. (CNIEC), and China National Chemical Import & Export Corp. (SINOCHEM)

Walter T. Belous, Vice President, Chi Mei Metals Corp.

Quick, Finan & Associates, Washington, D.C.

William Finan

Michael McKee

Yongfang Cao, Deputy General Manager, 8th Business Department, Minmetals

Michael A. Hertzberg)
Stuart E. Benson )
Jeffrey L. Snyder )
Samuel Zhang )
--OF COUNSEL

# APPENDIX D

## WORLD TUNGSTEN ORE RESERVES AND PRODUCTION

Table D.--World tungsten ore reserves and production, 1985

(In thousands of tons of tungsten content)

| Region | Reserves | Reserve base 1/ | Production |
|---|---|---|---|
| Asia: | | | |
| China | 1,200 | 1,230 | 15.0 |
| North Korea | 80 | 100 | 1.5 |
| Turkey | 65 | 70 | .2 |
| Other | 125 | 135 | 5.4 |
| Subtotal | 1,470 | 1,535 | 22.1 |
| North America: | | | |
| Canada | 480 | 670 | 3.1 |
| United States | 150 | 290 | 1.0 |
| Other | 8 | 25 | .3 |
| Subtotal | 640 | 985 | 4.4 |
| Europe: | | | |
| U.S.S.R. | 280 | 490 | 9.1 |
| United Kingdom | 70 | 70 | - |
| Other | 100 | 105 | 4.8 |
| Subtotal | 450 | 665 | 13.9 |
| Oceania: | | | |
| Australia | 130 | 140 | 1.9 |
| Other | 10 | 10 | - |
| Subtotal | 140 | 150 | 1.9 |
| South America: | | | |
| Bolivia | 45 | 70 | 1.6 |
| Other | 35 | 40 | 2.8 |
| Subtotal | 80 | 110 | 4.4 |
| Africa | 20 | 20 | .4 |
| World total 2/ | 2,800 | 3,500 | 47.1 |

1/ The reserve base includes demonstrated resources that are currently economic ("reserves"), marginally economic, and some of those that are currently subeconomic. Derived in collaboration with the U.S. Geological Survey.

2/ Because of rounding, totals may not add to the figures shown.

Source: The Economics of Tungsten, 1986, 5th edition, Roskill Information Services, Ltd., London.

# APPENDIX E

## U.S. IMPORTS OF SELECTED OTHER TUNGSTEN PRODUCTS

Table E-1.--Tungsten ore concentrate, tungsten metal powder, and tungsten carbide powder: U.S. imports for consumption, from selected sources, 1979-86

(In thousands of pounds of tungsten content)

| Product and source | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 |
|---|---|---|---|---|---|---|---|---|
| Tungsten ore concentrate: | | | | | | | | |
| Bolivia | 2,980 | 2,593 | 2,511 | 1,418 | 1,459 | 2,871 | 1,382 | 1,343 |
| Peru | 810 | 525 | 652 | 252 | 438 | 1,334 | 622 | 961 |
| China | 1,168 | 2,025 | 2,532 | 936 | 137 | 69 | 1,229 | 645 |
| Thailand | 1,246 | 1,046 | 706 | 295 | 313 | 1,706 | 1,041 | 556 |
| Portugal | 195 | 576 | 1,028 | 504 | 747 | 1,335 | 1,223 | 446 |
| Australia | 398 | 234 | 304 | 34 | 63 | 294 | 913 | 423 |
| Chile | 4 | - | - | 7 | 26 | 20 | - | 229 |
| Burma | 253 | - | 272 | 127 | 444 | 751 | 120 | 188 |
| Canada | 3,127 | 2,914 | 2,005 | 2,775 | 1,432 | 3,227 | 3,023 | 133 |
| Hong Kong | - | 21 | - | - | - | - | - | 107 |
| Republic of Korea | 84 | 19 | 156 | 20 | 257 | 39 | - | - |
| All other | 1,086 | 1,418 | 1,587 | 1,409 | 992 | 1,160 | 909 | 540 |
| Total | 11,352 | 11,372 | 11,752 | 7,778 | 6,307 | 12,806 | 10,464 | 5,570 |
| Tungsten metal powder: | | | | | | | | |
| West Germany | 13 | 69 | 92 | 132 | 20 | 32 | 37 | 66 |
| Republic of Korea | 509 | 361 | 271 | 356 | 55 | 7 | 20 | 37 |
| Belgium and Luxembourg | 1 | 1/ | 1 | 1/ | 2 | 8 | 2 | 5 |
| Japan | 15 | 1 | 1 | 1 | 1 | 6 | 7 | 5 |
| Austria | - | - | 1 | - | - | - | 1 | 4 |
| Canada | 4 | 9 | 3 | 3 | 1/ | 1 | 1/ | 1/ |
| China | 1/ | 1 | 1/ | 1 | 7 | - | 11 | - |
| All other | 103 | 27 | 3 | 6 | 2 | 5 | 15 | - |
| Total | 646 | 468 | 371 | 499 | 88 | 58 | 93 | 118 |
| Tungsten carbide powder: | | | | | | | | |
| West Germany | 320 | 385 | 536 | 615 | 437 | 700 | 566 | 524 |
| Republic of Korea | 72 | 72 | 111 | 66 | 33 | 103 | 84 | 90 |
| Belgium and Luxembourg | 1/ | 8 | 15 | 36 | 50 | 73 | 82 | 75 |
| China | - | 1 | 66 | 62 | 7 | 10 | 110 | 68 |
| United Kingdom | 6 | - | - | 2 | 1 | 92 | 69 | 50 |
| All other | 159 | 49 | 30 | 16 | 29 | 18 | 17 | 20 |
| Total | 557 | 515 | 757 | 799 | 558 | 994 | 930 | 827 |

1/ Less than 500 pounds.

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

Table E-2.--Calcium tungstate, potassium tungstate, sodium tungstate, other tungsten compounds, 1/ mixtures of inorganic compounds, and ferrotungsten: U.S. imports for consumption, from selected sources, 1982-86

(In thousands of pounds of tungsten content)

| Product and source | 1982 | 1983 | 1984 | 1985 | 1986 |
|---|---|---|---|---|---|
| Calcium tungstate: | | | | | |
| West Germany | 26 | 13 | 14 | 11 | 19 |
| All other | 2/ | - | 2 | 1 | 2 |
| Total | 26 | 13 | 15 | 12 | 21 |
| Potassium tungstate: | | | | | |
| Spain | - | - | 1,054 | - | - |
| All other | 1 | - | - | 3 | - |
| Total | 1 | - | 1,054 | 3 | - |
| Sodium tungstate: | | | | | |
| China | 15 | 1 | - | 289 | 285 |
| All other | - | 1 | 1/ | 43 | 2 |
| Total | 15 | 2 | 1/ | 332 | 287 |
| Other tungsten compounds: | | | | | |
| Canada | 1 | 1 | 2 | 2/ | 17 |
| Mexico | - | - | - | - | 12 |
| China | 842 | 141 | - | 44 | 2/ |
| All other | 5 | 3 | 1 | 2/ | 12 |
| Total | 848 | 144 | 3 | 45 | 41 |
| Mixtures of inorganic compounds: | | | | | |
| Canada | 1 | - | 5 | 4 | 11 |
| West Germany | 3 | 2 | 5 | 1 | 4 |
| Italy | - | - | 61 | - | - |
| All other | 13 | - | 1 | 9 | 7 |
| Total | 16 | 2 | 71 | 15 | 21 |
| Ferrotungsten and ferrosilicon tungsten: | | | | | |
| Austria | 24 | 55 | 205 | 59 | 188 |
| China | - | - | 17 | 50 | 165 |
| Portugal | 95 | 42 | 144 | 91 | 31 |
| All other | 35 | 9 | 253 | 6 | 24 |
| Total | 153 | 106 | 628 | 206 | 407 |

1/ Includes tungstic oxide.
2/ Less than 500 pounds.

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

# APPENDIX F

## U.S. COST OF PRODUCTION FOR APT

Table F.--APT: Costs of production as reported by * * *, 1982-86

* * * * * * *

# APPENDIX G

# SOURCES OF ERROR IN IMPORTERS' QUESTIONNAIRE DATA

U.S. imports of APT and tungstic acid from China as reported in questionnaire responses differ significantly from Commerce official statistics. Coverage of known importers of the products under investigation is 100 percent for 1984-86 and nearly that for 1982-83. These data, however, may be flawed in several ways. First, confusion has been created by the practice of some traders of holding the Chinese product in bonded warehouse. U.S. Customs records material as an import when it enters the U.S. territory, including when it is released from bonded warehouse. However, importers' bases for reporting imports differs and this may have resulted in double counting of imports. For example, * * *. Mr. Belous of Chi Mei, * * * stated at the hearing that Chinese APT is not stored for extended periods of time in bonded warehouse; however, * * * and counsel for respondents reported that Philipp Brothers, Inc., imported substantial quantities of APT in past years that remained in bonded warehouse until relatively recently. Respondents feel that such products should be considered as imports when they enter the country, as general import statistics reflect, rather than when they are released from bonded warehouse, which imports-for-consumption data show. 1/ General U.S. imports of APT from China, as reflected in Commerce data, are presented in the following tabulation (in thousands of lbs W):

| Year | APT imports |
|---|---|
| 1982 | 1,233 |
| 1983 | 220 |
| 1984 | 1,620 |
| 1985 | 2,958 |
| 1986 | 2,289 |

Also, both the importer-of-record and the purchaser may consider themselves to be importers. On at least one occasion, a company recorded as an import what was actually a purchase from * * *. Also, * * *; company officials disagree on whether double counting may have occurred. Attempts to eliminate double counting of imports have met with difficulty because major importers cannot find details of purchases. * * *. Such double counting may explain why questionnaire data are consistently higher than official statistics.

Further, questionnaire data on APT include imports of tungstic acid and may include some tungstic oxide as well. * * *.

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1/ See transcript of the hearing at pp. 104-105 and 160.

# APPENDIX H

# LETTERS FROM PURCHASERS

SinterMet Inc.
Subsidiary of ASKO Inc.

A-66

Delivery Address: North Park Drive
West Hills Ind. Park
Kittanning, PA 162(
Mailing Address: North Park Drive
West Hills Ind. Park
Kittanning, PA 162(
Phone: (412) 548-7631
Telex: 812-574

April 8, 1987

Mr. Kenneth R. Mason
Secretary
U. S. International Trade Commission
701 E Street, N.W.
Washington, DC 20436

Reference: Investigation File No. TA-406-11
Ammonium Paratungstate and Tungstic Acid from
the Peoples Republic of China

Dear Mr. Mason:

SinterMet, Inc., is a manufacturer of tungsten carbide wear parts. We begin our manufacturing process with the compaction of ready-to-press tungsten carbide powders which we purchase. We then sinter and fabricate the compacts with end-use markets in the metalworking industries.

Our products are custom manufactured to customer specifications. All jobs are quoted and no items are produced for stock.

Our raw material is comprised of powders which are mixtures of tungsten carbide and binder metals as well as die lubricants. The die lubricant which we use is paraffin wax. The binder metals include cobalt, nickel, and alloys of cobalt, nickel and chromium. We acquire these powders from a range of sources, both domestic and foreign.

Our firm is very active in exporting our products to markets beyond the borders of the United States. In fact, most of the growth which we have experienced during the last several years has been in the export marketplace. We have worked aggressively to build up a worldwide network of sales offices in the major metalworking countries. The growth of our exports has permitted SinterMet to increase its volume and its employment during each of the last several years. This is a situation which is atypical of the cemented carbide industry in the United States today.

SinterMet is greatly concerned that the actions contemplated by the United States International Trade Commission in regard to tungsten products from the Peoples Republic of China may potentially cause SinterMet to be at a disadvantage compared to our foreign competitors when selling our products in the export marketplace. Should those foreign competitors maintain access to lower cost tungsten products from the Peoples Republic of China than those which may be available in the United States, our costs of production will increase and our products will tend to lose their competitiveness in the export marketplace.

SinterMet Inc.
Subsidiary of ASKO Inc.

A-67

Delivery Address: North Park Drive
West Hills Ind. Park
Kittanning, PA 16201
Mailing Address: North Park Drive
West Hills Ind. Park
Kittanning, PA 16201
Phone: (412) 548-7631
Telex: 812-574



While we are certainly in favor of a strong domestic tungsten industry, including mining and refining, at the same time we recognize that today the United States must compete in global markets. In order to do so, it is imperative that our manufacturers maintain access to the lowest cost supplies of raw materials available to any global competitor.

Without those supplies, we will certainly face the prospect of diminishing production and reduced employment.

We would be pleased to offer answers to any questions which you may have concerning our comments, and we would like to thank you very much for the opportunity to present our position to the International Trade Commission.

Very truly yours,

SINTERMET, INC.

William H. Rackoff
President

WHR/jh

cc: S. R. Rackoff
E. L. Klaphake

KENNAMETAL®

**KENNAMETAL INC.**
P.O. Box 231
Latrobe, PA 15650

May 4, 1987

Mr. Kenneth R. Mason, Secretary
International Trade Commission
701 E. Street, N.W.
Washington, DC 20436

Dear Mr. Mason:

RE: TA-406-11

Having been represented at the hearing on April 29, 1987 concerning imports of APT from China, we are concerned that some extremely important issues for U.S. consumers of APT may not be given sufficient consideration.

Kennametal is one of the largest (possibly the largest) consumers of APT in the U.S. We do not manufacture APT and are therefore a major buyer of this product. APT is used as a starting point for a predominant portion of our products. Defense related business is a major part of our production.

The survival of the U.S. APT industry is most important to us, particularly the non-captive sector -- for with without this we would become dependent on our competitors (the captive APT producers) and imports for APT sourcing.

Claims, by the Chinese, at the hearing that their actions in March 1986 resulted in a change in sales tactics in the marketplace are simply not borne out by our experiences.

We received offers of Chinese APT from several sources during the 4th quarter of 1986 at prices in the $50-52/STU delivered, duty paid range which appears to be contrary to the claims being made by the Chinese.

As a result we are keen to reaffirm our full support for the RMA's petition against imports of Chinese APT, and we would appreciate it if the letter is made part of the hearing record.

Respectfully,

George F. Freeman

George F. Freeman
Manager - Corporate Purchasing

/ram