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Item 26



MINERAL INDUSTRY SURVEYS

U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
WASHINGTON, D.C. 20241



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Annual, Preliminary

TUNGSTEN IN 1976

Domestic production of tungsten concentrate in 1976, as measured by mine shipments, rose 9% to 6.0 million pounds of contained tungsten valued at \$40 million, according to the Bureau of Mines, U.S. Department of the Interior. Reported concentrate consumption increased 12% to 15.7 million pounds of tungsten. During the year, 12.6 million pounds of ammonium paratungstate (APT) was produced by "toll" conversion of tungsten concentrate and was shipped to intermediate processors. APT was produced by four processors and consumed by 10 users.

Exports of tungsten concentrate in 1976, from material purchased from the U.S. Government stockpile excesses, increased 20% and totaled 1.6 million pounds of contained tungsten. Most of this material was shipped to West Germany (35%), Japan (22%), the Netherlands (20%), and the United Kingdom (15%).

Imports for consumption of tungsten concentrate fell 23% and totaled 5.1 million pounds of contained tungsten. These imports were valued at \$33.8 million (about \$106 per short ton unit (stu) of tungsten trioxide (WO_3), including the U.S. duty). The tariff on tungsten concentrate imports from Market Economy Countries was \$3.97/stu and the statutory import duty applicable to most Centrally Controlled Economy Countries was \$7.93/stu. The major sources of imported concentrate in 1976 were: Canada (22%), Peru (18%), Bolivia (12%), Thailand (10%), Portugal and Mexico (9% each), The People's Republic of China (8%), Republic of Korea (5%), and Australia (4%).

While minor and intermittent tungsten concentrate production and/or shipments were reported from 44 mines in eight Western States (Arizona, California, Colorado, Idaho, Montana, Nevada, Utah, and Washington), two major mines continued to provide 95% of the 1976 domestic tungsten production. Operating continuously, these two mines recovered tungsten as a coproduct or byproduct of molybdenum. These operations were the Pine Creek mine and mill of the Metals Division, Union Carbide Corp. near Bishop, California, and the mine and mill of the Climax Molybdenum Co., a division of AMAX, at Climax, Colorado.

At Pine Creek tungsten ores were processed on a "straight-through" basis to ammonium paratungstate (APT), an intermediate upgraded form of tungsten. At Climax tungsten concentrate was recovered as a byproduct of molybdenum mining operations.

Union Carbide Corp. (UCC) continued mine development work and mill construction to reopen the Tempiute tungsten property near Almo in southern Nevada. This operation, initially scheduled to open in 1976, is now scheduled to begin operation in late 1977 and to reach full scale production, about two million pounds of tungsten yearly, in 1978. After being processed to low-grade concentrate (10% to 15% WO_3) at a mill adjacent to the Tempiute mine, this semiconcentrate will be transported to UCC's Pine Creek operation to be further processed to APT.

Annual consumption of tungsten products rose 19% to 15.4 million pounds of tungsten during 1976. Major end uses were as follows: Tungsten carbide cutting and wear resistant materials (including welding and hard facing rods and materials), 68%; tungsten metal mill products, 15%; tool, alloy, stainless, and heat resisting steels, 9%; chemicals and ceramics, 4%; superalloys, 2%; and other uses, 2%.

In 1976 the European price of tungsten concentrate as quoted in the Metal Bulletin (London) and reported in Metals Week reached a record high of \$136/stu. The price ranged from a low of 42.00 pounds sterling (£) per metric ton unit (mtu) to a high of 90.00 £/mtu (about \$76/stu to \$136/stu depending upon the prevailing rate of currency exchange). During the year the average price of tungsten concentrate was about \$104/stu of WO_3 .

The General Services Administration (GSA) sold 3.5 million pounds of excess stockpiled tungsten concentrate during the year. These sales, made on the basis of monthly sealed bids, were for export (53%) and for domestic use (47%). In addition, 0.2 million pounds of nonstockpile grade concentrate were awarded by GSA for domestic use only.

At a public meeting on October 1, 1976, the Federal Preparedness Agency of GSA announced new stockpile goals. The tungsten stockpile goals are given below.

(Thousand pounds, contained tungsten)

<u>Material</u>	<u>New Goal</u>
Tungsten Ores and Concentrate.....	8,823
Tungsten Metal Powder.....	3,290
Tungsten, Ferro.....	17,769
Tungsten Carbide Powder.....	12,845

During 1976, two meetings of the United Nations Conference on Trade and Development (UNCTAD) Committee on Tungsten were held in Geneva, Switzerland, to consider the feasibility of establishing an intergovernmental agreement on tungsten. Because definite terms of reference could not be agreed upon, no agreement was reached.

Studies by the Bureau of Mines were successfully conducted on the development of economic extractive metallurgical techniques to recover tungsten values from extremely low-grade brines, processing sludges, and scrap.