



To: D.J. Emery ←

Subject: The U.S. Market for Giant Arsenic Trioxide.

Date: April 13, 1981

INTER-OFFICE MEMORANDUM

From: D.N. Zeraldo

Copies to: TJD, PJR, JOK, File

1. Background

Initial investigations during the fall of 1978 and winter of 1979 indicated a substantial U.S. market existed for a Giant Arsenic Trioxide product grading 99% As_2O_3 . Considerable engineering on the design of a hot water leach process culminated in a successful pilot plant operation in the summer of 1979. However, the capital cost for the installation of such a full-scale hot water leach plant was ultimately estimated at \$4,000,000 which at the time did not provide a substantial improvement in R.O.I. over the alternative of erecting a loadout facility to ship crude baghouse dust for sale to a U.S. customer.

Further work on a fuming process, which offered the advantage of a lower capital cost and operating cost, was initiated in 1980 and a 3 year contract for the sale of baghouse dust to Koppers Company was completed in March 1980.

2. Market Fundamentals

The market can be divided into 2 primary segments, namely (a) the wood preserving industry, and (b) the agricultural chemical industry. The agricultural chemical industry presently is the largest end user and is capable of utilizing a product that grades as low as 95% As_2O_3 . As a result, this segment has historically been supplied by the only domestic U.S. producer Asarco Inc. which offers an in-bulk crude product to the U.S. market.

As the wood preserving industry began to grow in the mid 70's, its requirement for high grade refined arsenic trioxide could only be met by importing the drummed 99+% product offered by Boliden (Sweden), Salsigne, Pennaroya (France) and IMM (Mexico). One company, Koppers, developed a process that enabled it to use Asarco's crude product but still had to blend it with imported refined material.

The high growth wood preserving industry is now clearly the moving force behind the arsenic trioxide market. The wood preservers faced with limited sources of supply are now aggressively seeking out and attempting to develop new North American producers. This was witnessed by a recent visit to Giant by Osmose Wood Preserving Company which indicated in a follow-up letter that it was firmly prepared to purchase 5,000 tons/year of As_2O_3 from Giant for 5 years in the form of either crude baghouse dust or a refined product at competitive market prices.

The following U.S. supply/demand projection provides a more clear picture of the U.S. market over the next 4 years and the impact of the wood preserving industry's growing requirements.

U.S. Supply/Demand Projection (SDT)

	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
Supply:					
- Domestic Prodn. (Asarco)	7,000	8,000	10,000	10,000	10,000
- Imports (France, Sweden, Canada, Mexico)	9,000	14,000	21,000	21,000	21,000
	<u>16,000</u>	<u>22,000</u>	<u>31,000</u>	<u>31,000</u>	<u>31,000</u>
Demand:					
- Wood Preserving Industry	7,000	9,000	13,000	15,000	18,000
- Agr. Chemicals	15,000	15,000	15,000	15,000	15,000
	<u>22,000</u>	<u>24,000</u>	<u>28,000</u>	<u>30,000</u>	<u>33,000</u>
	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
(Deficit)/Surplus	(6,000)	(2,000)	+3,000	+1,000	(2,000)

The supply/demand projection shows that the wood preserving segment will account for all of the growth in the market for As_2O_3 over the next 4 years and will keep the market in approximate balance in spite of the large supply of new product coming in from Chile in 1982 (6,000 SDT/yr). Hence prices are expected to remain steady.

3. Price

The U.S. market operates on a two price system, the Asarco price is accepted as the price for material grading less than 98% As_2O_3 whereas the imported price is the bench mark for refined product (normally 99%+ As_2O_3).

In 1977 the difference in the Asarco (crude) price and the Import (refined) price was only 5-7¢ US/lb which more or less

covered the extra cost of foreign producers to drum their refined product.

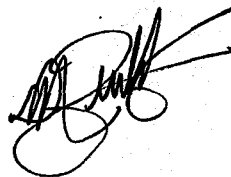
However as the wood preserver's requirements began to take-off in the mid 1970's the differential between the Asarco and the Import price began to widen to reflect the growing preference in the market for refined material so that by January, 1981 the premium for refined material had widened to 13-23¢ US/lb which is 6¢-18¢/lb above the cost of drumming product. The appended price graph highlights the general increase in prices and the increase in the premium for refined product.

It seems clear the U.S. arsenic trioxide market, and in particular the U.S. wood preserving industry, represents a growing long term demand for refined As_2O_3 .

4. Conclusion and Recommendation

The buoyant markets for the wood preservers' products over the next 5 years as well as the premium obtainable in the marketplace for a refined product strongly suggests that Giant seriously investigate:

- (a) recovery of baghouse dust stored in underground stopes, and
- (b) installation of a fuming plant to refine current baghouse production when the sales contract with Koppers expires in 1983 or in addition refine material reclaimed from underground.

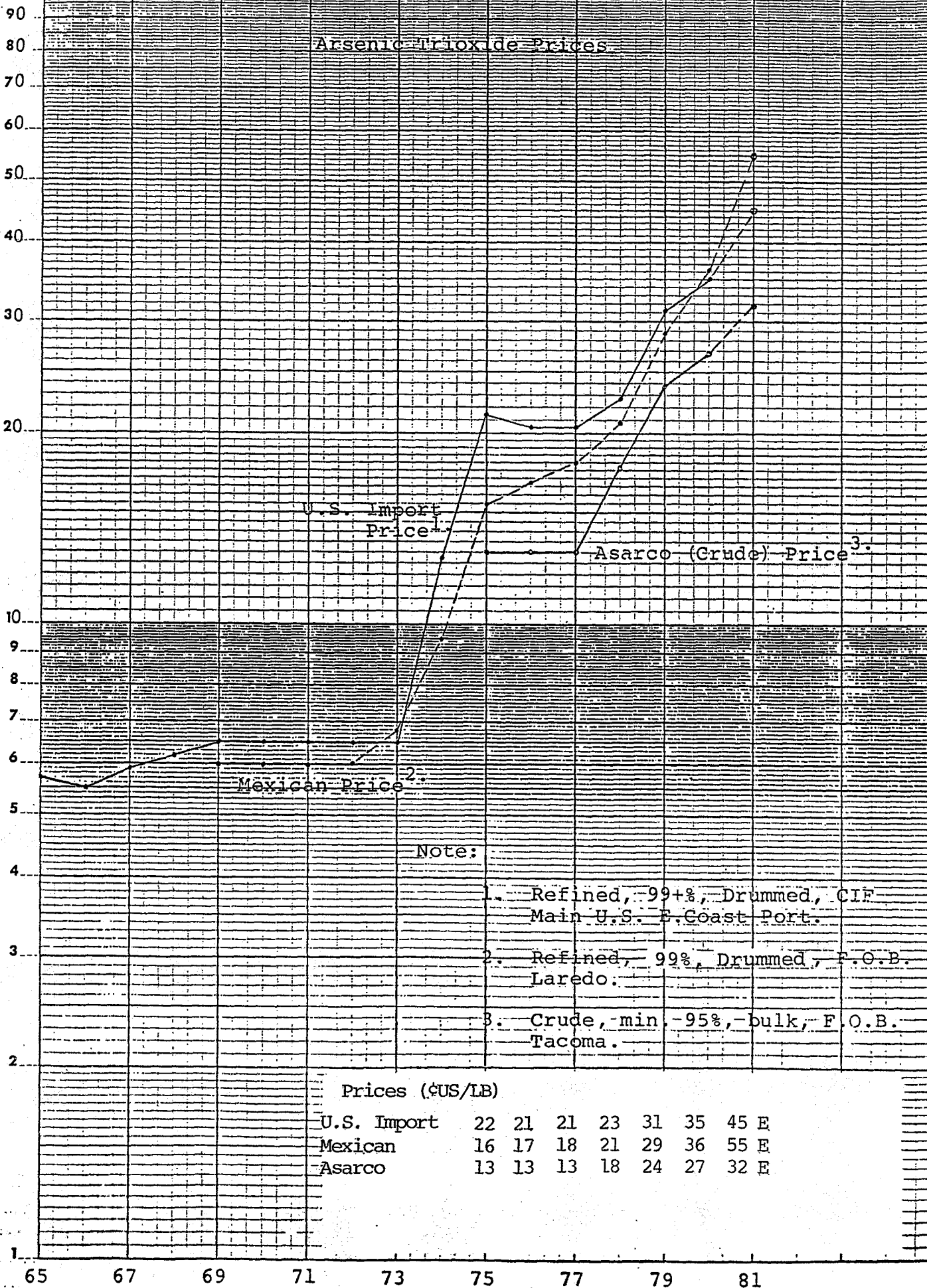


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Price (US\$/lb)

Arsenic Trioxide Prices



Prices (\$US/LB)	1965	1967	1969	1971	1973	1975	1977	1979	1981
U.S. Import	5.5	5.8	6.2	6.5	16	21	21	31	45
Mexican	5.5	5.8	6.2	6.5	16	17	18	21	29
Asarco	5.5	5.8	6.2	6.5	13	13	13	18	24