

CALCINED BAUXITE PROPPANTS FROM AUSTRALIA

Determination of the Commission in
Investigation No. 731-TA-411
(Preliminary) Under the Tariff Act
of 1930, Together With the
Information Obtained in the
Investigation



USITC PUBLICATION 2100

JULY 1988

UNITED STATES INTERNATIONAL TRADE COMMISSION

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Note.--Information that would reveal confidential operations of individual firms may not be published and therefore has been deleted from this report. Deletions are indicated by asterisks.

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, DC

Investigation No. 731-TA-411 (Preliminary)

CALCINED BAUXITE PROPPANTS FROM AUSTRALIA

Determination

On the basis of the record 1/ developed in the subject investigation, the Commission determines, pursuant to section 733(a) of the Tariff Act of 1930 (19 U.S.C. § 1673b(a)), that there is a reasonable indication that an industry in the United States is materially injured or threatened with material injury by reason of imports from Australia of calcined bauxite proppants, provided for in item 521.17 of the Tariff Schedules of the United States, that are alleged to be sold in the United States at less than fair value (LTFV).

Background

On June 14, 1988, a petition was filed with the Commission and the Department of Commerce by Carbo Ceramics, Inc., Irving, TX, alleging that an industry in the United States is materially injured or threatened with material injury by reason of LTFV imports of calcined bauxite proppants from Australia. Accordingly, effective June 14, 1988, the Commission instituted preliminary antidumping investigation No. 731-TA-411 (Preliminary).

Notice of the institution of the Commission's investigation and of a public conference 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 June 24, 1988 (53 FR 23808). The conference was held in Washington, DC, on July 5, 1988, and all persons who requested the opportunity were permitted to appear in person or by counsel.

1/ The record is defined in sec. 207.2(i) of the Commission's Rules of Practice and Procedure (19 CFR § 207.2(i)).

VIEWS OF THE COMMISSION

Based on the information gathered in this preliminary investigation, we determine that there is a reasonable indication that an industry in the United States is threatened with material injury by reason of imports of calcined bauxite proppants from Australia that are allegedly sold at less than fair value (LTFV). ^{1/}

Like Product and Domestic Industry

As a threshold determination, we are required to define the "like product" and the relevant "domestic industry" to be examined for the purpose of assessing reasonable indication of material injury. Section 771(4)(A) of the Tariff Act of 1930, as amended, defines the term "industry" as "the domestic producers as a whole of a like product, or those producers whose collective output of the like product constitutes a major proportion of the total domestic production of that product." ^{2/} "Like product" is defined as "a product which is like, or in the absence of like, most similar in characteristics and uses with, the article subject to an investigation" ^{3/}

The Commission's like product determination is based on the facts of each

^{1/} Material retardation is not an issue in this investigation and will not be discussed further.

^{2/} 19 U.S.C. § 1677(4)(A).

^{3/} 19 U.S.C. §1677(10).

investigation. ^{4/} Factors we generally examine in making this decision include: (1) physical characteristics and uses, (2) interchangeability, (3) channels of distribution, (4) customer or producer perceptions of the articles, and (5) the use of common manufacturing facilities and production employees. ^{5/} No single factor is dispositive, and the Commission may consider other factors which it deems relevant based on the facts of a given investigation.

The products subject to this investigation are calcined bauxite proppants (also called ceramic proppants). ^{6/} Calcined bauxite proppants are round particles used in the fracturing of oil and gas wells to prop open fractures in oil and gas-bearing rock, facilitating product extraction. They are made by first firing bauxite pellets at high temperature and then separating the pellets into convenient size ranges. Calcined bauxite proppants are produced in four varieties — high strength, intermediate strength, intermediate strength/low density and, occasionally, resin-coated. The imported product is a high strength calcined bauxite proppant.

^{4/} : Asociacion Colombiana de Exportadores de Flores, 12 CIT __, Slip Op. 88-91 at 9 (July 14, 1988).

^{5/} See, e.g., Nitrile Rubber from Japan, Inv. No. 731-TA-384 (Final), USITC Pub. No. 2090 (June 1988).

^{6/} "The article subject to an investigation" is defined by the scope of the Department of Commerce (Commerce) investigation. Commerce, in its Notice of Initiation, has defined the scope of the investigation as follows:
 calcined bauxite proppants from Australia currently provided for under TSUSA item number 521.1720 and currently classifiable under HS item number 2606.00.00.60. The subject merchandise is used in oil and gas wells to cause hydraulic fracturing to promote product extraction.
 53 Fed. Reg. 26299 (1988).

Petitioner proposed a like product definition that would include all calcined bauxite proppants regardless of strength, size, or coating, but would exclude other proppants such as sand, whether resin-coated or not. ^{7/}

Respondent Comalco Aluminum Ltd. does not contest this definition of the like product, except to state briefly that resin-coated sand competes with calcined bauxite proppants. ^{8/ 9/}

All calcined bauxite proppants share the same essential physical characteristics and production process: they are composed primarily of bauxite and are produced by firing up to temperatures of 2-3000 degrees Fahrenheit. Further, all such proppants are used for the same general purpose, to enhance product recovery in oil and gas wells by propping open formations in wells. ^{10/} All domestic and foreign calcined bauxite proppants of all types are in part produced on common manufacturing equipment

^{7/} Petitioner's postconference brief at 3-4.

^{8/} Respondent's postconference brief at 3. With regard to respondent's statement, we note the following: (1) the production of resin-coated sand involves the mining of sand and not the calcination of bauxite, (2) resin-coated sand has a significant application outside the proppant market, (3) between resin-coated sand and calcined bauxite proppants there are differences in characteristics such as strength and conductivity, production process, production lines and workers, and possible uses, and (4) the per-pound price of resin-coated sand is about half that of calcined bauxite proppants. Report at A-2. Similar distinctions can be drawn between calcined bauxite proppants and Ottawa or Brady frac sand.

^{9/} Commissioner Cass notes that there may be a substantial basis behind respondent's contention that resin-coated sand should be included in the like product definition. He encourages the Commission to seek additional information on this point in any final investigation.

^{10/} Report to the Commission (Report) at A-1-A-2.

using common production employees, ^{11/} have similar channels of distribution, and share the same knowledgeable customer group. ^{12/}

Accordingly, we determine that the like product is all calcined bauxite proppants (exclusive of other proppants), regardless of strength, size, or coating, ^{13/} and the domestic industry comprises producers ^{14/} of calcined bauxite proppants.

Condition of the domestic industry ^{15/}

In determining the condition of the domestic industry, the Commission considers, among other factors, domestic production, capacity, capacity

^{11/} We note that domestic intermediate strength/low density proppants are pellets shaped in fluidized beds, and that the Australian producer does not use grinders or mixers to shape its pellets; however, all calcined bauxite proppants are fired in essentially the same way.

^{12/} Id. at A-3-A-4, A-10-A-12; Petitioner's postconference brief at 4.

^{13/} The Commission has in past cases found one like product in spite of differences among grades of the same product. See Electrolytic Manganese Dioxide from Greece, Ireland, and Japan, Invs. Nos. 731-TA-406-408 (Preliminary), USITC Pub. 2097 (July 1988); Potassium Permanganate from the People's Republic of China, Inv. No. 731-TA-125 (Final), USITC Pub. 1480 (Jan. 1984) (Three distinct grades found to be one like product); Nitrile Rubber, supra at 4 (No like product distinction among various grades differing in raw material mix); Antifriction Bearings (Other than Tapered Roller Bearings) and Parts Thereof from the Federal Republic of Germany, France, Italy, Japan, Romania, Singapore, Sweden, Thailand, and the United Kingdom, Invs. Nos. 303-TA-19-20 and 731-TA-391-399 (Preliminary), USITC Pub. 2083 (May 1988) (No like product distinction based on size considerations).

^{14/} Report at A-13.

^{15/} The discussion in this and the following sections of our opinion is necessarily limited as all the specific data falls within the Commission's guidelines for business confidential information.

utilization, domestic consumption, shipments, inventories, employment, and financial performance. ^{16/} No single factor is determinative. In each investigation the Commission must consider the particular nature of the relevant industry in making its determination.

The demand for calcined bauxite proppants is derived principally from the level of drilling activity in the oil and gas industry. The number of oil wells drilled in the U.S. declined steadily from 1984 through 1987, and then increased in January-March 1988 as compared with the corresponding period in 1987. ^{17/} U.S. apparent consumption of proppants declined from 1985 through 1986, recovered part of that decline in 1987 and, increased in interim 1988 compared to interim 1987. ^{18/}

Production of calcined bauxite proppants was lower in 1987 than in 1985, but increased in interim 1988 over interim 1987. Capacity jumped in 1985-1986 and remained constant thereafter. Capacity utilization reflected the trends in production, but remained at low levels throughout the period of investigation. ^{19/}

The quantity of domestic shipments of calcined bauxite proppants fell from 1985 through 1986, partially recovered in 1987, and rose in interim 1988 compared with interim 1987. The value of domestic shipments fell from 1985

^{16/} 19 U.S.C. § 1677(7)(C)(iii).

^{17/} Report at A-15.

^{18/} Id. at A-17. Several factors have contributed to demand increases in the face of continuing declines in well drilling — use of man-made proppants at the expense of sand, concentration of proppants per cubic foot, drilling activity in remedial wells, and the recommended height of closure stress levels. Id.

^{19/} Id. at A-17-A-18, Table 8.

through 1986 and, in contrast to the sharp jump in quantity shipped, declined again in 1987. The value of domestic shipments increased in interim 1988 as compared with interim 1987; however, we note that the unit value per pound of calcined bauxite proppants was less in interim 1988 than it was in 1985. ^{20/} Inventories declined from 1985 through 1987 and rose in interim 1988. As a percent of domestic shipments, inventories declined steadily from 1985 through 1987 and from interim 1987 through interim 1988. ^{21/}

The number of employees producing calcined bauxite proppants fell from 1985 through 1987, and increased in interim 1988. The number of hours and wages paid followed the same pattern. ^{22/}

The financial condition of the domestic industry is indicative of poor performance throughout the period of investigation. Although there was some improvement in interim 1988 as compared with interim 1987, the domestic industry remained at a low level of financial performance. ^{23/}

Reasonable Indication of Threat of Material Injury by Reason of Allegedly LTFV Imports from Australia ^{24/}

The statute sets forth a series of factors the Commission is to

^{20/} Id. at A-18, Table 9.

^{21/} Id. at A-19, Table 11.

^{22/} Id. at A-20, Table 12.

^{23/} Report at A-21, Table 15. The atypical characteristics of the two companies, especially in the areas of depreciation and/or amortization, distorted the operating results. Report at A-20.

^{24/} Commissioner Cass believes there may be sufficient evidence to support a finding that there exists a reasonable indication of material injury to a domestic industry by reason of allegedly dumped imports of the subject merchandise, but, in light of the Commission's unanimous determination on threat, does not make any determination of present material injury in this preliminary investigation.

consider in analyzing the issue of a reasonable indication of threat of material injury. ^{25/} These factors are: (1) any increase in production capacity or existing unused capacity in the exporting country likely to result in a significant increase in imports to the United States; (2) any rapid increase in United States market penetration and the likelihood that the penetration will increase to an injurious level; (3) the probability that imports of the merchandise will enter the United States at prices that will have a depressing or suppressing effect on domestic prices of the merchandise; (4) any substantial increase in inventories of the merchandise in the United States; (5) the presence of underutilized capacity for producing the merchandise in the exporting country; (6) any other demonstrable adverse trends that indicate the probability that the imports will be the cause of actual injury; and (7) the potential for product-shifting.

In addition, in order to conclude that there is a reasonable indication that alleged LTFV imports are a threat of material injury to the domestic industry, the Commission must find that the threat of material injury is real and that actual injury is imminent. Such a determination may not be made on the basis of mere conjecture or supposition. ^{26/}

Imports of calcined bauxite proppants from Australia have recently

^{25/} 19 U.S.C. § 1677(7)(F).

^{26/} Id.

increased in volume, capturing a larger market share in early 1988 than in 1986-87. ^{27/ 28/} Significant sales of imports are likely to continue in the near future. ^{29/} The evidence indicates that these sales will not be due to any creation of, or increase in, foreign production capacity — indeed, the foreign producer's operation is closed — ^{30/} but rather will result from large inventories currently held by both the importer and the foreign producer. These inventories increased in the aggregate substantially from 1985 through 1987, and in spite of a decline from interim 1987 to interim 1988 are still at significant levels. ^{31/} Since the United States is the biggest market for the subject imports — far more important, in fact, than the Australian home market — it is highly likely that most of the inventories held

^{27/} Report at A-25. Imports in 1986 were adversely affected by litigation concerns.

^{28/} Acting Chairman Brunsdale finds that the allegedly dumped imports caused a reduction in the sales volume of the domestic like product during the period of investigation. The low volume of import sales and their insignificant market penetration through the end of 1987 preclude a finding of material injury to the domestic producers in that time frame. However, significant import sales have apparently occurred within the first half of 1988, report at A-25, a period for which we have only incomplete data for domestic producers. In the event that this investigation proceeds to a final injury determination, we request further information regarding the terms of recent contracts, particularly information on terms covering delivery timing and possible renegotiation of prices and/or quantities.

^{29/} The record indicates that imports in the near future may double their share of the U.S. market. Report at A-25.

^{30/} The record is not clear as to the feasibility or likelihood of the Australian industry being able to retool production in the short-term.

^{31/} Id. at A-24-25, Table 20.

in Australia will be sold in the United States in the near future. ^{32/}

As to the possible effect of the subject imports on domestic prices, we note that Australian calcined bauxite proppants undersold the domestic like product by significant margins in every price comparison. ^{33/ 34/}

Moreover, this took place during a period of declining domestic prices. ^{35/ 36/ 37/}

^{32/} Tr. at 29, Report at A-24.

^{33/} Report at A-29.

^{34/} Commissioner Liebeler does not base her decision in this investigation on evidence of underselling by the imported product. She believes that evidence of underselling or overselling ordinarily is not probative on the issues of causation or threat. Such evidence sometimes provides useful information on product differentiation. See Internal Combustion Engine Fork Lift Trucks from Japan, Inv. No. 731-TA-377 (Final) (1988) (Additional Views of Chairman Liebeler).

^{35/} The record contains no information to suggest that there is a potential for product-shifting in this investigation. We will explore this question more fully if the investigation returns for a final phase.

^{36/} Acting Chairman Brunsdale finds that the record does not support the view that domestic prices have been sensitive to changes in import volumes or import prices over the period of investigation. Domestic prices rose during the latter part of the period of investigation despite an increase in the disposal of import inventories. Report at A-28. The fact that the only foreign producer has ceased production and has not maintained its plant in operable condition greatly reduces its role in the strategic interaction among firms in the industry. For this reason, domestic price developments largely reflect the interaction between the active domestic producers, each of which has significant excess capacity.

^{37/} Acting Chairman Brunsdale notes that total cost per unit of volume, not weight, is relevant to end users of the products considered in this investigation. The high strength proppants that are the subject of this investigation are denser than the intermediate strength proppants that constitute almost all of the the domestic production over the period of investigation. Also, users of imported high strength proppants are subject to royalty payments not incurred by users of domestic intermediate strength proppants. For these reasons, comparisons of prices for equal weights of different proppants may not be particularly informative in this case.

Based on the foregoing, we determine that there is a reasonable indication that the domestic calcined bauxite proppants industry is threatened with material injury by reason of imports from Australia allegedly sold at LTFV. ^{38/}

^{38/} See Oil Country Tubular Goods from Canada and Taiwan, Invs. Nos. 701-TA-255 and 731-TA-276-277 (Final), USITC Pub. 1865 (June 1986) (Views of the Majority). "We recognize that there have been several causes of injury to the domestic OCTG industry during the period of investigation, including decreased demand for the product." Id. at 11. "It is possible for both declining demand and unfairly traded imports to materially injure an industry. In fact, the imports might result in relatively greater injury to an industry facing a downturn in demand." Id. at 12. "In this instance, the domestic OCTG industry not only experienced decreased sales and profits, but also lost market share as the unfair imports gained market share during the period of investigation. We further note that the difficulties of the domestic industry may be due in part to causes other than imports, but that the existence of such causes does not preclude and may exacerbate the harmful effect of unfair imports." Id. at 13.

INFORMATION OBTAINED IN THE INVESTIGATION

Introduction

On June 14, 1988, a petition was filed with the U.S. International Trade Commission and the U.S. Department of Commerce by counsel on behalf of Carbo-Ceramics, Inc., Irving, TX. The petition alleged that imports of calcined bauxite proppants from Australia are being sold in the United States at less than fair value (LTFV), and that an industry in the United States is materially injured and threatened with material injury by reason of such imports.

Accordingly, effective June 14, 1988, the Commission instituted preliminary antidumping investigation No. 731-TA-411 (Preliminary) under the applicable provisions of the Tariff Act of 1930 to determine whether there is a reasonable indication that an industry in the United States is materially injured, or is threatened with material injury, or the establishment of an industry in the United States is materially retarded, by reason of imports of such merchandise into the United States.

Notice of the institution of the Commission's investigation and of a public conference 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 June 24, 1988 (53 FR 23808). 1/ The conference was held in Washington, DC, on July 5, 1988. 2/ The Commission voted on this investigation on July 26, 1988.

The Commission has not conducted previous and/or related investigations of the subject products.

The Product

Description and uses

Calcined bauxite proppants are fine, dense, intermediate to high-strength, spherical pellets used by the petroleum industry to increase oil and gas recovery from hydraulically fractured wells.

Since the 1940's, hydraulic fracturing has been used as a technique for increasing production from hydrocarbon reservoirs. The hydraulic fracturing operation involves pumping a fluid (usually a high viscosity waterbased gel) at high rates (barrels per minute) and high pressures (often greater than 10,000 pounds per square inch (psi)) into the rock formation. The fracture is usually vertical in wells deeper than 5,000 feet, and is typically 500 to 1,500 feet long, 50 to 100 feet high, and one-tenth of an inch wide. 3/

The purpose of creating the fracture is to provide a permeable pathway through which oil and/or gas can flow. In order to maximize flow through the

1/ Copies of the Commission's and Commerce's notices are presented in app. A.

2/ A list of witnesses appearing at the conference is presented in app. B.

3/ "An Overview of the Use of Proppants in Hydraulic Fracturing", Carbo Ceramics, Inc., pamphlet, August 1987.

fracture, a proppant (which "props" open the fracture) is added to the gelled fracturing fluid. After the fracture is generated to its designed geometry, the well is shut in and the gelled fluid is allowed to break (viscosity decreases) and the formation closes against the proppant pack. With proper design, fluids will then flow through the proppant in the fracture much more easily than through the formation, resulting in a production rate increase. 1/

History.--When hydraulic fracturing began in the late 1940's, it was discovered that production increases were prolonged if propping agents were used to hold the fractures open. One of the first proppants used was sand. Novelties such as iron shot, high strength quenched glass beads, round walnut shells, aluminum pellets, and plastic beads were manufactured in the 1960's to give the industry a vast array of high strength and deformable proppants. As deeper wells were drilled in the early 1970's, the shortcomings of glass and quartz became apparent (both are relatively soluble in hot formation brines and tend to fail catastrophically under high closure stress). This led oil and gas production companies to undertake extensive research towards the development of high-strength sintered bauxite proppants. 2/

Product descriptions.--The three general types of proppants currently being used in hydraulic fracturing are sand, resin coated sand, and bauxite proppants. Current market shares for each of these proppants as a percent of the total proppant market, and list prices, as estimated by industry sources, are presented below:

<u>Proppant type</u>	<u>Share</u> <u>(percent)</u>	<u>Price</u> <u>(per pound)</u>
Frac sand.....	90.0	\$.06
Resin coated sand.....	***	.35
Bauxite.....	***	.60-.75
Total	100.0	

Frac sands.--Sand, commonly used in shallow wells, is by far the most widely used proppant, primarily because sand is the least expensive at approximately 6 cents per pound. At greater depths the increasing pressure causes the sand grains to crush, reducing permeability and therefore decreasing oil and gas recovery. Shallow wells are considered to be less than 8,000 feet deep. 3/

Resin coated sands.--Resin coated sands are commonly used in shallow to intermediate-depth wells and are available in two types, curable and precured. 4/ The major application of the curable resin coated proppant (AcFrac CR, manufactured by Acme Resin) is in situations where the producing zone of the well will not retain an ordinary proppant. The curable coating

1/ For example, the permeability of an intermediate-strength bauxite proppant (20/40 Carbo-Prop HC) at 5,000 psi closure stress is greater than 500 darcy (a measure of flow through a static bed), while a prolific oil bearing formation may have a permeability of 0.05 darcy, and many gas producing formations have permeabilities less than 0.001 darcy. (Ibid., p. 2).

2/ Proppants, Western Company pamphlet, 1984, p. 1.

3/ Conference Transcript (TR), p. 21.

4/ Proppants, Western Petroleum Services.

bonds the proppant grains to each other and to the formation, thus preventing proppant flow-back (migration of the proppants back to the wellhead) and subsequent loss of productivity and damage to well equipment.

Precured resin coated sands (AcFrac PR, manufactured by Acme Resin) are heated frac sands coated with resin; as a result, the resin or plastic coating imparts additional strength to the sand grains by infilling imperfections in the grains and provides a "cushion" which reduces point loading on individual grains. The resin also helps to contain sand crushed under high closure stresses, thus preventing the migration of crushed material ("fines") during well production.

Bauxite proppants.--Bauxite proppants are commonly used in intermediate (8,000 to 15,000 feet) to deep wells (greater than 15,000 feet). 1/ The three general categories of bauxite proppants are low density/intermediate strength, intermediate strength, and high strength. Each category contains a variety of trade names, with each product having slightly different performance characteristics.

Low density/intermediate strength.--Carbo-Lite, manufactured by Carbo Ceramics, Inc., has a specific gravity and bulk density close to sand, but because it is more resistant to crushing, Carbo-Lite can be used in intermediate depth wells up to closure stresses of 9,000 psi. 2/ As a result of the unique process of manufacturing, Carbo-Lite is different in appearance and, to some extent, different in physical properties from the intermediate strength proppants.

Intermediate strength.--Proppants such as Carbo-Prop HC (Carbo Ceramics), and Interprop I and Interprop Plus (Norton-Alcoa) are intermediate strength proppants used in wells ranging from 8,000 to 15,000 feet deep. 3/ These proppants exhibit greater strength than the low density/intermediate strength proppants. For example, Carbo Ceramics recommends the use of Carbo-Prop HC for closure stresses ranging between 7,000 and 12,000 psi, whereas Carbo-Lite is recommended only up to 9,000 psi. 4/ These proppants are produced in four size ranges by manufacturing techniques similar to those used for high strength bauxite. The difference between intermediate and high strength bauxite proppants lies primarily in the raw materials used. Intermediate strength proppants are produced from bauxite ores that contain a significant amount of mullite (a less dense form of aluminum oxide than corundum) whereas high strength bauxite proppants are produced from bauxite ore that is primarily corundum.

1/ TR, p. 21.

2/ Technical Literature File, Carbo Ceramics, Inc.

3/ A third type of intermediate strength proppant is ZirProp 126, which is manufactured by SPRE in France as a byproduct of the refractory industry from silica sands rich in zirconium oxide. Due to rapid cooling in the manufacturing process, approximately 60 percent (by weight) of the proppant is a glassy phase. As a result, the zirconium proppants are brittle and display catastrophic failure at higher closure stresses (Proppants, Halliburton Services, pp. 11 and 12).

4/ Technical Literature File, Carbo Ceramics, Inc.

High strength: Proppants such as Dura-Prop (Comalco), Ultraprop I (Norton Alcoa), and Sintered Bauxite HC (Carbo Ceramics) are considered high-strength proppants and are used in deep wells with very high closure stresses and/or extremely severe downhole conditions such as high-temperature acidic environments. In contrast to the intermediate-strength bauxite proppants, high-strength proppants are composed primarily of corundum, which when sintered is one of the hardest minerals known, and gives sintered bauxite proppants their excellent crush resistance.

Chemical characteristics.-- Because of its strength and hardness characteristics, abrasive grade calcined bauxite (AGB) is the principal raw material used in the production of intermediate- and high-strength bauxite proppants. Target properties of premium grade AGB on a calcined basis are: 1/

High aluminum oxide (Al ₂ O ₃).....	Greater than 85%
Iron to silica ratio.....	2 to 1
Titania (TiO ₂) <u>1/</u>	Greater than 3%, less than 4%
Presence of fines.....	Minimum

1/ An oxide which increases toughness of alumina crystals.

A comparison of the typical chemical compositions of various proppants currently used in hydraulic fracturing is presented in table 1.

Table 1
Typical compositions of various proppants
(In percent)

Item	Corundum <u>1/</u> (Al ₂ O ₃)	Mullite Al ₆ Si ₂ - O ₁₃)	Cristo- balite (SiO ₂)	Amorphous Phase <u>2/</u>	Quartz (SiO ₂)
SAND.....	--	--	--	--	98-100
RESIN COATED SAND <u>3/</u> ...	--	--	--	--	95-100
LOW DENSITY/INTER-MEDIATE STRENGTH:					
Carbo-Lite.....	--	52	27	21	--
INTERMEDIATE STRENGTH:					
InterProp Plus.....	39	54	--	7	--
Carbo-Prop HC.....	55-60	40-45	--	--	--
HIGH STRENGTH: <u>4/</u>					
Dura-Prop.....	75	24	--	--	--
Sintered Bauxite HC..	77	22	--	--	--

1/ A form of aluminum oxide, corundum is one of the hardest materials known to man and measures nine on the Moh hardness scale; quartz measures seven and diamond measures ten (Proppants, Western Company pamphlet, p. 2).

2/ Non-crystalline.

3/ AcFrac PR, containing approximately 4 percent by weight resin.

4/ High-strength bauxite proppants which would fall under the Exxon use patent.

Source: Halliburton Services, Proppants, p. 4.

1/ Bauxite, "Proceedings of the 1984 Bauxite Symposium", p. 85.

Physical properties.--A granular material must fulfill several conditions to be suitable for use as a propping agent. As described in industry literature, the physical properties that will affect fracture conductivity and ultimately well production are as follows (see table 2 for a comparative summary of physical data for various proppants): 1/

Proppant strength,
Grain size,
Grain-size distribution,
Quality (amount of fines and impurities),
Roundness and sphericity, and
Proppant density (specific gravity).

Table 2
Physical data for various 20/40 mesh proppants

Item	Acid solubility (percent)	Sphericity	Bulk density (lb/ft ³)	Specific gravity
SAND.....	1.20	0.80	102.70	2.65
RESIN COATED SAND <u>1/</u>	1.20	0.90	100.40	2.56
BAUXITE:				
Low density/intermediate strength:				
Carbo-Lite.....	1.30	0.90	101.50	2.75
Intermediate strength:				
InterProp Plus.....	3.20	0.90	113.50	3.25
Carbo-Prop HC.....	2.70	0.80	114.10	3.28
High strength: <u>2/</u>				
Dura-Prop.....	1.80	0.80	135.00	3.74
Sintered Bauxite HC..	2.80	0.90	132.50	3.74

1/ AcFrac PR, containing 4 percent phenolic resin by weight.

2/ High-strength bauxite proppants which would fall under the Exxon use patent.

Source: Halliburton Services, Proppants, p. 4.

Proppant strength.--When a hydraulic fracture is created, the "in-situ" stresses must be overcome to open and propagate the fracture. These same stresses try to close the fracture and act on the proppant; often referred to as closure stress. The selected proppant material must have high strength to avoid crushing when exposed to high pressure during application. Laboratory crush tests are used as one measure of strength, and the results of a comparative analysis of various proppants are presented in table 3.

1/ Dowell Schlumberger, "Proppant selection guide", pp. 1-5.

Table 3
Crush test results for various 20/40 mesh proppants

Item	Percent crushed at:			
	7,500 psi	10,000 psi	12,500 psi	15,000 psi
SAND.....	N/A	N/A	N/A	N/A
RESIN COATED SAND <u>1</u> /.....	1.20	3.70	8.80	13.30
BAUXITE:				
Low density/intermediate strength:				
Carbo-Lite.....	0.92	6.80	10.60	24.00
Intermediate strength:				
InterProp Plus.....	0.24	0.81	2.14	4.43
Carbo-Prop HC.....	0.75	2.54	6.41	10.70
High strength: <u>2</u> /				
Dura-Prop.....	4.38	7.83	10.90	15.90
Sintered Bauxite HC...	1.03	2.30	4.11	8.79

1/ AcFrac PR, containing 4 percent resin by weight.

2/ High-strength bauxite proppants which would fall under the Exxon use patent.

Source: Halliburton Services, Proppants, p. 4.

Grain size and grain-size distribution.--Proppants are available in mesh sizes of 16-20, 16-30, 20-30, 20-40, and 40-70. Proppants having larger proppant grain sizes (mesh size 16-20) provide a more permeable pack under low closure stress conditions. However, larger grain sizes can be more difficult to use in deeper wells because of greater susceptibility to crushing (as grain size increases, strength decreases) and placement problems (a wider fracture is required, and the settling rate of particles increases with increasing size). 1/

Quality.--A higher percentage of smaller grains or impurities can have the same effect on the proppant-pack permeability as invading formation fines.

Roundness and sphericity.--Proppant grain roundness is a measure of the relative sharpness of grain corners, or of grain curvature. Particle sphericity is a measure of how close the proppant particle or grain approaches the shape of a sphere. Stresses in the proppant grains are more evenly distributed when the grains are round and about the same size; therefore, the grains will resist a higher load before grain failure occurs.

1/ Approximately 80 percent of all proppants sold fall in the 20-40 sizing category, as that is the size that most closely fits the opening of the fracture that is created in the earth (TR, p. 37).

Proppant density.--High-density proppants are more difficult to suspend in the fracturing fluid and to transport in the fracture. Placement can be achieved in two ways: (1) using high-viscosity fluids which carry the proppant the length of the fracture with minimal settling; and (2) using low-viscosity fluids which require a higher flow velocity for proper placement in the fracture.

In addition to the physical properties of proppants mentioned above, there are a number of other factors that influence fracture conductivity. Fracture conductivity is dependent upon proppant properties, closure stress, drawdown rate, formation properties (proppant embedment conditions), and resultant propped fracture widths. However, the choice between proppant types is based primarily on well conditions and economics.

Laboratory testing.--The American Petroleum Institute (API) generates recommended specifications and testing procedures for propping agents, which are the minimal standards accepted by the industry. 1/ In 1986, the majority of the proppant industry's suppliers and purchasers formed a consortium, and established Stim Lab, an independent testing laboratory to undertake long-term testing of propping agents. The 25 consortium members include the 2 U.S. producers of the subject product, the Australian producer/exporter, U.S. suppliers of frac fluids, and the service companies.

Short-term (8 hours), in-house laboratory testing is continually being conducted by both producers and suppliers of calcined bauxite proppants. Short-term testing has its limitations and industry references have indicated that laboratory measured proppant permeability data obtained from the API standardized test should be adjusted downward by 50 to 90 percent in order to be equivalent to in-situ permeabilities. 2/ Long-term (200 hours) testing data show a general trend of rapid conductivity decline during the first month followed by little or no decline during the remainder of the test (initial decline is the result of proppant consolidation and reorientation). 3/

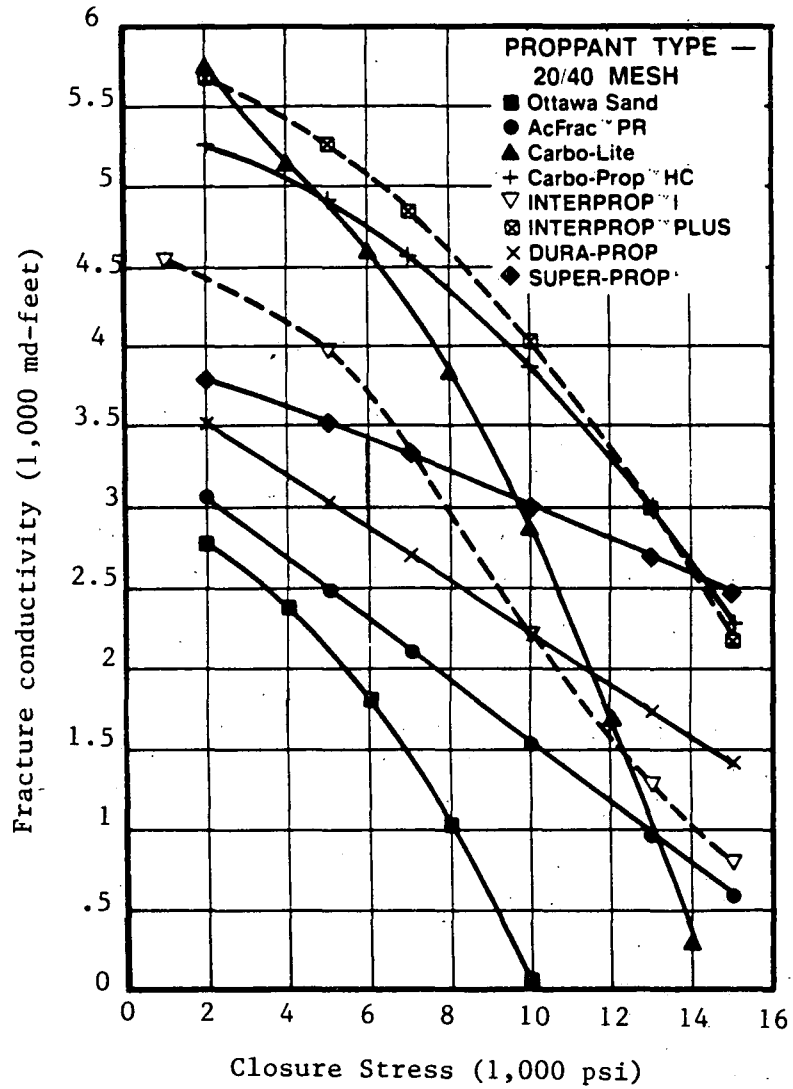
Laboratory tests are but one tool used in measuring proppant performance. Industry sources have cautioned that proppant selection should be made after thorough evaluation of performance that would also consist of the use of "decline curves" in conjunction with case histories, mathematical and econometric models, and post-frac analyses. Given its limitations, the results of laboratory performance tests comparing various proppant products measuring conductivity are presented in figures 1 and 2.

1/ For example, API RP 56, "API recommended practices for testing high strength proppants used in hydraulic fracturing operations."

2/ This is done to account for field influences such as residual gel, embedment of the proppant into the formation, porosity blockage by fines, and other effects that are not measured using the standard laboratory testing equipment ("Overview", Carbo Ceramics pamphlet, p. 4).

3/ The magnitudes of decline are estimated at 20 percent in the first two weeks, followed by less than 5 percent in the remaining weeks. (SPE, 14133, p. 487).

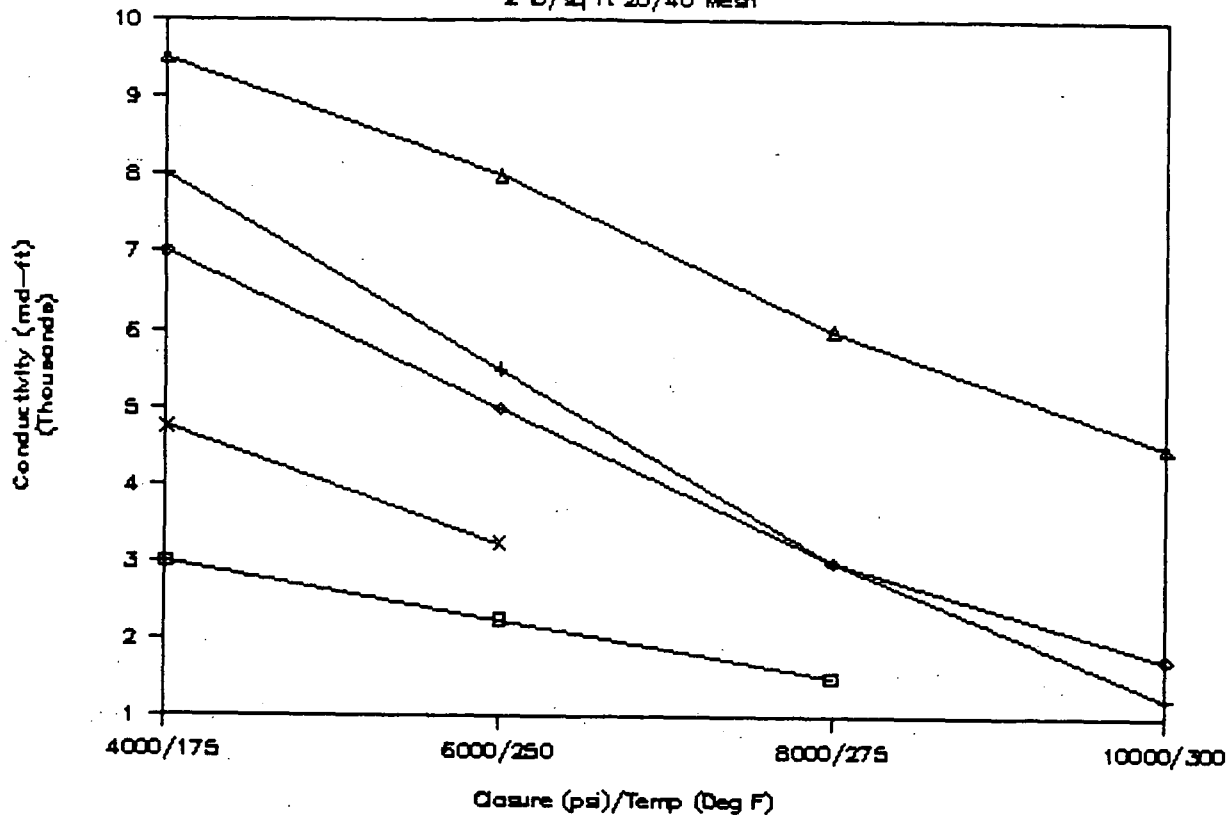
Figure 1.--COMPARATIVE CONDUCTIVITY DATA
(2 lb/sq. ft.)



NOTE: Tests were conducted on a short term basis (8 hours) using a radial flow test cell.

SOURCE: Halliburton Services, Proppants, p. 4.

Figure 2.-- Long-term Conductivity
2 lb/sq ft 20/40 Mesh



□ AcFrac CR 1/ X Dura-Prop 2/ + Carbo-Lite ◇ InterProp Plus △ Sintered Bauxite

1/ AcFrac CR was tested at constant 275 degree F to a recommended 8,000 psi level. Tests are currently being carried out to 10,000 psi.

2/ Dura-Prop tests were conducted using acidized Indiana Limestone, rather than the Ohio sandstone used with the other proppants tested. Nonetheless, Dura-Prop results have been plotted as an indication of relative order.

NOTE: Tests were conducted on a long-term basis (200 hours) using a linear flow test cell.

SOURCE: Stim Labs, "Final Report on the Investigation of the Effects of Fracturing Fluids upon Conductivity of Proppants", Jan. 18, 1988.

Manufacturing Considerations

U.S. manufacturing processes

The relationship between proppants and their performance characteristics is partially dependent upon proppant microstructure, which is controlled by the raw materials and manufacturing processes. Along with intrinsic raw material chemistry, the manufacturing process defines proppant microstructural integrity, with particle size, distribution of phases in the final pellet microstructure, and porosity being controlled by the manufacturing process. For example, when using lower grade ores (lower alumina), finer ground powders will produce strengths similar to higher grade ores with coarser grinds, because a finer grind will result in a more compact, stronger pellet. 1/ A review of the manufacturing processes used by proppant producers follows.

Frac sands.--The production process for sand used as proppants is a relatively simple one. High-quality sand is processed by washing and sorting it into various size ranges. The two most common sands are Ottawa, mined primarily in Illinois and south central Minnesota, and Brady, mined in Texas. 2/

Resin coated sand. 3/--Resin coated sands are produced by coating high-quality frac sand grains with phenolic-type (plastic) resin. The precured resin coated variety is produced by heating the sand with an open-flame (at approximately *** degrees F) and applying the phenolic resin coating, which gives the sand grains additional strength. 4/

Bauxite proppants.--There are two basic methods used in the production of bauxite proppants. The low-density/intermediate-strength proppant (Carbo-Lite) is produced in a continuous operation utilizing a fluidized bed, whereas the other intermediate-strength and high-strength proppants are produced using a semi-continuous process without the use of fluidized beds.

Low density/intermediate strength.--Carbo-Lite (Carbo Ceramics) is produced in Eufala, AL, by a patented process utilizing a fluidized bed to form individual proppant particles. 5/ The raw materials, bauxitic clays mined locally in Alabama, enter the fluidized bed in the form of a slurry (raw

1/ "Evaluation of Long-term Proppant Stability", S.L. Cobb and J.J. Farrell, Society of Petroleum Engineers paper No. SPE 14133, p. 484.

2/ Major frac sand producers include Badger Mining, Wedman Silica, and Uniman; these producers manufacture sand principally for use as abrasives in glass, sandblasting, and foundry industries (July 12, 1988, telephone interview with * * *).

3/ Resin producers will also manufacture resin coated calcined bauxite proppants, whereby the bauxite proppant is supplied by the customer (service company) or the U.S. producer for a particular customer. (Petitioner's postconference brief, p. 3; and July 12, 1988, telephone interview with * * *).

4/ Producers of resin-coated sand include: Acme Resin, a subsidiary of Borden Chemical, manufacturing resin-coated sand principally for foundry industries (July 12, 1988, telephone interview with * * *); and Santrol Products, manufacturing resin-coated sand almost exclusively for the proppant industry (July 12, 1988, telephone interview with * * *).

5/ United States Patent 4,440,866, Apr. 3, 1984.

materials mixed with water) which is sprayed onto a layer of partially dried bauxite "seed" particles. These seed particles, which consist of fine dust particles produced in the production process, are repeatedly coated with slurry in a stream of drying air. The particles grow in size while the size distribution of the particles is determined by the residency time in the fluidized bed. The semi-soft (green) pellets subsequently undergo a drying and sintering process in a kiln, which is accomplished by heating the pellets to a temperature around 2,700 degrees F. At this temperature the individual particles within each pellet fuse together, giving the pellet added strength. The proppants are then cooled, sized, and stored in silos to await shipment.

Intermediate and high strength.--Intermediate- and high-strength proppants can be produced by one of two methods depending upon the ore available. 1/ The manufacturing process employed in the United States by the two U.S. producers is similar and consists of the following five steps: milling, forming, drying, firing, and sizing.

In the production of Carbo Prop HC and Sintered Bauxite (Carbo Ceramics), as well as InterProp Plus and Ultraprop I (Norton-Alcoa), pellets must first be formed from bauxite ore. 2/ In the production process, bauxite ore is ground to a fine powder in a ball mill. The bauxite is then combined in mixers with a binding material and water in a batch-continuous process to form small wet pellets. These pellets are conveyed to a dryer to remove water and to a screen where the unwanted sizes are separated and returned for mixing. The semi-soft (green) pellets are then fired at about *** degrees F in a continuous operation to join the individual grains of the proppant together causing the proppant to increase in hardness. The product is subsequently cooled, sized, and stored in storage tanks.

Both the intermediate- and high-strength proppants are produced by this process. The difference in the strength of the proppants is a result of the raw materials used. As noted previously, in the production of intermediate-strength proppants, ores with a significant amount of mullite (a less dense form of aluminum oxide than corundum) in addition to corundum are used, whereas in the production of high-strength bauxite proppants, ore which is primarily corundum is used. 3/ It is the increase in the corundum content that imparts added strength to the proppants.

Australian manufacturing process

Abrasive grade bauxite in Australia consists of naturally occurring spheres or "pisolites." Because it is a mined product, industry references have described the Australian Dura-Prop as being "produced by a process more similar to that of sand plants than that used to manufacture sintered bauxite

1/ A third method of manufacturing is employed by the French in the production of ZirProp 126. During the manufacturing process, silica sands rich in zirconium oxide are heated to a molten state and then quickly cooled. Rapid cooling causes the individual grains to contract, thereby minimizing their surface area-to-volume ratio. The resulting product is an extremely smooth, round, blue-grey proppant. (Halliburton Services, "Proppants", p. 10).

2/ * * *

3/ Halliburton Services, Proppants, pp. 8-9.

proppants." 1/ Counsel for Comalco has provided a description of the manufacturing process used by the Australian producer before ceasing proppant operations; it consisted of four phases: * * *. 2/

* * * * *

Ceramic processing

The application of heat in the manufacturing of bauxite proppants creates a ceramic proppant, and provides for the following results:

- 1) Dried--drying at approximately 300° F drives out free water;
- 2) Calcined--heating at approximately 800° F to drive out chemically held water; and
- 3) Sintered--firing at approximately 2,800° F brings the product to 80 percent of its fusion (melting) point, maximizing the density of the crystal structure (a sintered proppant is twice as strong as a fused/melted proppant).

Sintered bauxite proppants are unique in that they are one of the few bauxite materials which have high strength in small particles. This characteristic is achieved by the controlled composition of very small crystals during the sintering process. These alpha alumina crystals are less than 12 microns in size and are in a random orientation so the microstructure is an interlocking intergrowth of crystals without continuous planes of weakness. The absence of the continuous shear planes in the sintered bauxite particles provides exceptional strength and resistance to crushing. 3/

U.S. Tariff Treatment

U.S. imports of calcined bauxite proppants are classified in schedule 5 of the Tariff Schedules of the United States (TSUS), in item 521.17, which includes refractory-grade calcined bauxite and "other" calcined bauxite. 4/ The subject products from Australia are currently "Free" under the column 1 rate of duty. 5/

1/ Ibid., p. 13.

2/ July 15, 1988, submission by Margaret Pfeiffer, counsel for Comalco.

3/ "Sintered Bauxite Proppants for Deep Oil and Gas Well Stimulation," Stephen Crittenden, Society of Mining Engineers Preprint #83-132, p. 1.

4/ Refractory-grade calcined bauxite is the principal high-duty refractory material used to line furnace and ladles of the steel-, copper-, aluminum-, and glass-producing industries. Abrasive-grade calcined bauxite is the major ingredient in abrasive products used for precision grinding, surfacing, and polishing metals. (Mineral Facts and Problems, Dept. Interior, 1985, p. 1).

5/ The rates of duty in col. 1 are most-favored nation (MFN) rates and are applicable to imported products from all countries except those Communist countries and areas enumerated in general headnote 3(d) of the TSUS, unless preferential tariff treatment is sought and granted to eligible imports.

Nature and Extent of Alleged Sales at LTFV

The petitioner alleges that producers or exporters of calcined bauxite proppants in Australia are selling the subject product at LTFV margins of 64 to 86 percent. LTFV margins were calculated by comparing the U.S. price with the constructed value of the Australian merchandise.

The U.S. Market

U.S. producers

There are currently two U.S. manufacturers of calcined bauxite proppants. The two firms are Carbo Ceramics, Inc., Irving, TX; and Norton-Alcoa, Fort Smith, AR. Both firms are in support of the petition, and have responded to the Commission's questionnaires. 1/

The following tabulation shows U.S. manufacturers' production levels for calcined bauxite proppants in 1987 and their shares of production (in percent):

<u>Company</u>	<u>Quantity</u> <u>(1,000 pounds)</u>	<u>Share</u> <u>(percent)</u>
Carbo Ceramics.....	***	***
Norton-Alcoa.....	***	***
Total.....	***	100.0

The petitioner, Carbo Ceramics, Inc., is a privately held company operating two proppant production plants at New Iberia, LA, and Eufala, AL. Known as the Carborundum Company when bauxite proppants first began to be produced in 1979, the petitioner has gone through a series of restructurings and mergers and has been known as Carbo Ceramics since June 30, 1987. 2/

Norton-Alcoa Proppants is a partnership of Norton Proppants, a wholly-owned subsidiary of Norton Company and Alcoa Proppants, a wholly-owned subsidiary of Aluminum Company of America (Alcoa). The partnership was formed in January 1984, * * *.

U.S. importers

Imported calcined bauxite proppants are included in a residual or so-called "basket" category of abrasive grade bauxite. The category includes calcined bauxite, other than refractory grade. Information identifying the importer and purchasers of imported calcined bauxite proppants was provided by the petitioner, and was verified against files provided by the U.S. Customs Service. The Commission sent questionnaires to the importer and four purchasers of calcined bauxite proppants. The one importer and four purchasers

1/ A third firm, General Abrasives (a division of Dresser Industries), was bought by Carbo Ceramics' predecessor company in April 1986.

2/ In 1979 the petitioner was known as the Carborundum Company, a division of the Kennecott Company. * * *.

are believed to account for all imports/purchases of imports of calcined bauxite proppants from Australia.

The importer of record for calcined bauxite proppants from Australia during the period of investigation was Treco Sales, a distributor of industrial silica sands. Treco's shipments of the subject product accounted for * * * percent of its total shipments in the peak year of 1985.

The four U.S. purchasers, accounting for all imports during the period of investigation, provided usable data on their imports/purchases of calcined bauxite proppants from Australia. The following tabulation presents information on their purchases of imports during January-March 1988, their locations, purchase levels, and each purchaser's share of total imports of calcined bauxite proppants:

<u>Purchaser</u>	<u>Location</u>	<u>Purchases of imports</u>		<u>Share (percent)</u>	
		<u>1,000 lbs.</u>	<u>\$1,000</u>	<u>(lbs.)</u>	<u>(dollars)</u>
*	*	*	*	*	*

Channels of distribution

Calcined bauxite proppant producers and importers ship bauxite proppants almost exclusively to oil and gas industry service companies. The service companies for calcined bauxite proppants are the purchasers listed above (with the exception of * * *).

In response to Commission questionnaires, U.S. producers and purchasers accounting for all imports of calcined bauxite proppants from Australia provided information on shipments of the subject products. These data, based on thousands of pounds, are presented in table 4.

Table 4
Calcined bauxite proppants: Channels of distribution, 1985-87

* * * * *

Shipments of imports of the subject product were made exclusively to service companies during 1985 and 1987 (no sales were made in 1986). However, during January-March 1988, sales and shipments of imports were begun to end users, accounting for *** percent of total purchases during that period (see tabulation below).

	<u>Quantity</u> <u>(1,000 pounds)</u>	<u>Share</u> <u>(percent)</u>
Purchases of imports by--		
Service companies.....	***	***
End users.....	***	***
Total.....	***	100.0

Market factors

Demand factors.--The demand for calcined bauxite proppants is derived principally from the level of drilling activity in the oil and gas industry. Statistics on drilling activity and wellhead prices for oil and gas are presented in tables 5 and 6, and clearly indicate an industry in decline during the period of investigation. Increased activity in the number of oil wells drilled during January-March 1988, when compared to the corresponding period of 1987, is the only upward movement in indicators for the period of investigation.

Table 5
Number of oil and gas wells drilled, by depth of well, 1980-87

(Number of wells in thousands)								
Item	1980	1981	1982	1983	1984	1985	1986	1987
Depth interval (feet):								
Under 5,000.....	46.3	58.8	55.2	50.2	55.1	45.2	23.5	15.9
5,000-9,999.....	18.1	23.9	20.5	17.8	22.1	18.9	10.5	8.1
10,000-14,999.....	4.3	5.6	5.6	4.2	5.1	4.7	2.8	1.9
15,000-over.....	0.8	1.0	1.3	0.8	0.7	0.7	0.4	0.3
Total.....	69.5	89.3	82.6	73.0	83.0	69.5	37.2	26.2

Source: American Petroleum Institute.

Table 6
Wellhead prices of crude oil and natural gas, 1980-87, January-March 1987, and January-March 1988

Period	Crude oil		Natural gas	
	Price (per barrel)	No. wells (thousands)	Price (per 1,000 cu. ft.)	No. wells (thousands)
1980.....	\$21.59	32.3	\$1.59	17.2
1981.....	31.77	42.8	1.98	19.9
1982.....	28.52	38.8	2.46	18.7
1983.....	26.19	36.8	2.59	14.3
1984.....	25.88	42.2	2.66	16.8
1985.....	24.09	34.6	2.51	14.1
1986.....	12.51	18.2	1.94	7.7
1987.....	15.41	15.6	1.71	7.5
January-March--				
1987.....	14.31	3.5	1.76	1.8
1988.....	13.33	4.2	1.83	1.8

Source: U. S. Department of Energy, Monthly Energy Review, March 1988.

Legal environment.--Supply and demand has been affected by the legal environment within the oil and gas drilling industry, which is governed by patents, trademarks, and secret manufacturing processes. Patents on processes and use of calcined bauxite proppants include:

<u>Patent name</u>	<u>Ownership</u>	<u>Description</u>
Colpoys <u>1/</u>	Union Carbide	Use of all bauxite proppants
Cooke	Exxon	Use of sintered bauxite proppants
Fast <u>2/</u>	Amoco	Hydraulic fracturing process
Fitzgibbons	Standard Ohio	Manufacturing of intermediate-strength proppants
Lunghofer	Carbo Ceramics	Manufacturing and use of low-density, intermediate-strength proppants

1/ Challenged by Exxon in 1978, and resulted in Union Carbide maintaining ownership of the patent but donating it to the public for use in the industry.
2/ Expired during the late 1950's.

Both the Cooke and Fitzgibbons patents have been the subject of litigation during the period of investigation.

Cooke patent.--On March 3, 1986, Exxon Production Research (EPR) filed suit against Halliburton Services, claiming infringement of the Cooke patent in the use of sintered bauxite proppants in deep wells. 1/ At issue was Halliburton's use of Comalco's Dura-Prop in a drilling operation in South Texas, and EPR's claim that Dura-Prop is a sintered bauxite proppant with a specific gravity of at least 3.6 used in a well greater than 7,500 feet, and, therefore, subject to the limitations of the Exxon use patent. On January 7, 1987, EPR and Halliburton reached an agreed decision, and a settlement agreement was arranged, whereby * * *. 2/

Fitzgibbons patent.--During the fall of 1985, Norton-Alcoa initiated litigation against Standard Oil of Ohio seeking a Declaratory Judgement that the Fitzgibbons patent covering intermediate proppants is invalid, unenforceable, and not infringed by Norton-Alcoa's products. Standard Oil filed a counterclaim charging infringement of its patent, and the case is still pending. 3/

Apparent U.S. consumption

Data on apparent U.S. consumption of calcined bauxite proppants have been obtained in response to Commission questionnaires and are shown in table 7.

1/ Although Halliburton was named in the suit as the "user" of the subject proppant, it had been indemnified by Comalco for \$*** to cover losses in the event of an adverse judgment. Comalco had agreed to indemnify all potential purchasers of its product pending the outcome of the litigation (June 27, 1988, telephone conversation with * * *).

2/ * * *.

3/ * * *.

Table 7

Calcined bauxite proppants: U.S. producers' domestic shipments, imports, and apparent consumption, 1985-87, January-March 1987, and January-March 1988

* * * * *

Trends in apparent consumption.--Total market sales of calcined bauxite proppants decreased from *** pounds in 1985 to *** pounds in 1986, or by *** percent, and then increased to *** pounds in 1987, or by *** percent. Sales of these proppants were *** pounds during January-March 1988, or *** percent greater than sales during the corresponding period of 1987.

Several factors are believed to have contributed to the increase in consumption of calcined bauxite proppants since 1986, despite statistical indicators showing a decline in drilling activity, including:

- Increased use of man-made proppants at the expense of sand proppants;
- Increased concentration of proppants per cubic foot;
- Increased drilling activity in remedial wells that may have been inactive for years; and
- Increase in the recommended height of closure stress levels.

U.S. producers' share of apparent consumption.--From 1985 to 1987, U.S. producers' share of total apparent consumption of the subject calcined bauxite proppants increased irregularly, from *** percent to *** percent. When compared with the corresponding period of 1987, the U.S. producers' share of total apparent consumption during January-March 1988 decreased by *** points to *** percent.

Consideration of Alleged Material Injury

The information in this section of the report was compiled from responses to questionnaires of the U.S. International Trade Commission. The two producers that provided questionnaire responses are believed to account for all U.S. production of calcined bauxite proppants.

U.S. production, capacity, and capacity utilization.

Data on reported U.S. production, end-of-period capacity, and capacity utilization of calcined bauxite proppants are presented in table 8. Production of all calcined bauxite proppants decreased from *** pounds in 1985 to *** pounds in 1986, or by *** percent. Production increased in 1987 to *** pounds, or by *** percent. Production during January-March 1988 amounted to *** pounds, an increase of *** percent compared with the level of production in the corresponding period of 1987.

Table 8

Calcined bauxite proppants: U.S. production, end-of-period capacity, and capacity utilization, 1985-87, January-March 1987, and January-March 1988

* * * * *

Capacity utilization for all calcined bauxite proppants was *** percent in 1985, decreased to *** percent in 1986, and then increased to *** percent in 1987. During January-March 1988, the rate increased to *** percent from *** percent in the corresponding period of 1987.

U.S. producers' domestic shipments

Data on U.S. producers' domestic shipments of calcined bauxite proppants are presented in table 9. U.S. producers' domestic shipments of all calcined bauxite proppants decreased from *** pounds 1985 to *** pounds in 1986, or by *** percent, and then increased by *** percent to *** pounds from 1986 to 1987. Shipments during January-March 1988 amounted to *** pounds, an increase of *** percent compared with the level of domestic shipments in the corresponding period of 1987.

Table 9

Calcined bauxite proppants: U.S. producers' domestic shipments, 1985-87, January-March 1987, and January-March 1988

* * * * *

The value of U.S. producers' domestic shipments of all calcined bauxite proppants decreased from \$*** in 1985 to \$*** in 1986, or by *** percent, and then decreased by *** percent to \$*** in 1987. During January-March 1988 shipments amounted to \$***, an increase of *** percent compared with the level in the corresponding period of 1987.

The unit value of U.S. producers' domestic shipments of calcined bauxite proppants decreased from *** cents per pound in 1985 to *** cents per pound in 1986, and then fell to *** cents per pound in 1987; the unit value during January-March 1988 was *** cents, an increase compared with the unit value of *** cents during January-March 1987.

U.S. exports

The information obtained in response to the Commission's questionnaire is presented in table 10. U.S. producers' exports * * * from 1985 to 1986, as a result, * * *. Export shipments fell by *** percent from 1986 to 1987 (* * *); export shipments *** during January-March 1988, when compared to the corresponding period of 1987, due to * * *. The level and trends of unit

values of export shipments are * * * to that of U.S. producers' domestic shipments, because export sales are * * *. 1/

Table 10

Calcined bauxite proppants: U.S. producers' exports, 1985-87, January-March 1987, and January-March 1988

* * * * *

U.S. producers' inventories

U.S. producers' inventories of all calcined bauxite proppants decreased from *** pounds as of December 31, 1985, to *** pounds as of December 31, 1986, or by *** percent (table 11). Inventories increased to *** pounds as of December 31, 1987, or by *** percent. Inventories on March 31, 1988, amounted to *** pounds, an increase of *** percent compared with the level of inventories on March 31, 1988.

Table 11

Calcined bauxite proppants: U.S. producers' end-of-period inventories, 1985-87, January-March 1987, and January-March 1988

* * * * *

As a share of U.S. producers' total domestic shipments during the preceding year, inventories decreased from *** percent as of December 31, 1985, to *** percent as of December 31, 1986, and then decreased to *** percent as of December 31, 1987. On the basis of annualized shipments, the ratio was *** percent as of March 31, 1987, decreasing to *** percent as of March 31, 1988. The relatively high level of inventories compared with domestic shipments is consistent with the fact that customers (i.e., service companies) do not maintain inventories of the relatively expensive intermediate- and high-strength proppants, and require 1-day delivery directly to a production site.

U.S. producers' employment and wages

The average number of production and related workers producing all calcined bauxite proppants for the two domestic producers decreased from *** in 1985 to *** in 1986, or by *** percent, and continued to decrease in 1987 to *** employees, or by *** percent (table 12). The number of workers in January-March 1988 was ***, representing an increase of *** percent from the *** workers in the corresponding period of 1987. The number of hours worked by production and related workers producing all calcined bauxite proppants decreased from *** to *** during 1985-87. The number of hours worked in January-March 1988 was ***, representing an increase of *** percent from the

1/ July 15, 1988, telephone conversation with * * *.

number worked in the corresponding period of 1987. The trend in hourly wages and labor productivity was generally increasing during the period of investigation; however, increases from 1986 to 1987 are * * *. Employees at the two U.S. establishments producing calcined bauxite proppants are not represented by unions.

Table 12

Employment statistics for U.S. establishments in which calcined bauxite proppants are produced: Average number of employees, hours worked, wages, hourly wages, and labor productivity, 1985-87, January-March 1987, and January-March 1988

* * * * *

Financial experience of U.S. producers

Both producers of calcined bauxite proppants are engaged * * * in the manufacture of the subject product within their establishments. 1/ The * * * characteristics of the two companies, especially in the areas of depreciation and/or amortization, distorted the operating results. A discussion of each producer is presented below:

Carbo Ceramics, Inc.--The petitioner is the successor company to several prior organizations, as indicated below:

* * * * *

Table 13

Income-and-loss experience of Carbo Ceramics, Inc., on its operations producing calcined bauxite proppants, accounting years 1985-87 and interim periods ended March 31, 1987, and March 31, 1988

* * * * *

Norton-Alcoa 2/--Norton-Alcoa Proppants is a partnership of Norton Proppants, Inc., a wholly owned subsidiary of Norton Company (Norton) and Alcoa Proppants, Inc., a wholly owned subsidiary of Aluminum Company of America (Alcoa). * * *.

* * * * *

1/ * * *.

2/ Financial statements of Norton-Alcoa Proppants, 1985-87.

Table 14

Income-and-loss experience of Norton-Alcoa on its operations producing calcined bauxite proppants, accounting years 1985-87 and interim periods ended March 31, 1987, and March 31, 1988

* * * * *

Income-and-loss experience of both U.S. producers.--The combined income-and-loss experience of the two producers is presented in table 15. Aggregate net sales declined by *** percent from \$*** in 1985 to \$*** in 1986. Such sales rose by *** percent to \$*** in 1987. In 1985, operating income was \$***. * * *. Net sales for the 1988 interim period were \$***, an increase of *** percent over 1987 interim period sales of \$***. In interim 1988 * * *. * * *.

Table 15

Income-and-loss experience of 2 U.S. producers on their operations producing calcined bauxite proppants, accounting years 1985-87 and interim periods ended March 31, 1987, and March 31, 1988

* * * * *

Investment in productive facilities.--The investment in productive facilities of the two producers are presented in table 16.

Table 16

Calcined bauxite proppants: Value of property, plant, and equipment of U.S. producers, accounting years 1985-87 and interim periods ended March 31, 1987, and March 31, 1988.

* * * * *

Capital expenditures.--The two producers supplied data on their capital expenditures for the period of investigation (table 17).

Table 17

Calcined bauxite proppants: Capital expenditures by U.S. producers, accounting years 1985-87 and interim periods ended March 31, 1987, and March 31, 1988

* * * * *

Research and development expenses.--The outlays for research and development expenses on calcined bauxite proppants for the two producers are shown below (in thousands of dollars):

* * * * *

Capital and investment.--The Commission requested U.S. producers to describe any actual or potential negative effects of imports of calcined bauxite proppants from Australia on their firms' growth, investment, and ability to raise capital. * * * provided the following response:

* * * * *

Consideration of the Question of Threat of Material Injury

Section 771(7)(F)(i) of the Tariff Act of 1930 (19 U.S.C. § 1677(7)(F)(i)) provides that--

In determining whether an industry in the United States is threatened with material injury by reason of imports (or sales for importation) of any merchandise, the Commission shall consider, among other relevant factors 1/--

(I) If a subsidy is involved, such information as may be presented to it by the administering authority as to the nature of the subsidy (particularly as to whether the subsidy is an export subsidy inconsistent with the Agreement),

(II) any increase in production capacity or existing unused capacity in the exporting country likely to result in a significant increase in imports of the merchandise to the United States,

(III) any rapid increase in United States market penetration and the likelihood that the penetration will increase to an injurious level,

(IV) the probability that imports of the merchandise will enter the United States at prices that will have a depressing or suppressing effect on domestic prices of the merchandise,

1/ Section 771(7)(F)(ii) of the act (19 U.S.C. § 1677(7)(F)(ii)) provides that "Any determination by the Commission under this title that an industry in the United States is threatened with material injury shall be made on the basis of evidence that the threat of material injury is real and that actual injury is imminent. Such a determination may not be made on the basis of mere conjecture or supposition."

(V) any substantial increase in inventories of the merchandise in the United States,

(VI) the presence of underutilized capacity for producing the merchandise in the exporting country,

(VII) any other demonstrable adverse trends that indicate the probability that the importation (or sale for importation) of the merchandise (whether or not it is actually being imported at the time) will be the cause of actual injury, and

(VIII) the potential for product-shifting if production facilities owned or controlled by the foreign manufacturers, which can be used to produce products subject to investigation(s) under section 701 or 731 or to final orders under section 736, are also used to produce the merchandise under investigation.

The available information on the volume, U.S. market penetration, and pricing of imports of the subject merchandise (items (III) and (IV) above) is presented in the section entitled "Consideration of the causal relationship between allegedly LTFV imports and the alleged material injury or threat thereof." The available data on foreign producers' operations (items (II) and (VI) above) and U.S. inventories of the subject products (item (V)) follow. "Product shifting" is not an issue in this case.

Information in this section of the report was received by the Commission from counsel for the foreign producer. Additional information as requested by Commission staff that has been provided by the U.S. embassy in Canberra is also presented and noted.

Foreign production, capacity, and capacity utilization

There is one manufacturer/exporter of calcined bauxite proppants in Australia that exports to the United States--Comalco Limited. Based on information provided by counsel for Comalco, exports to the United States * * * of total shipments. Information on the Australian industry's production, capacity, and total shipments is presented in table 18.

Table 18

Calcined bauxite proppants: Australian production, capacity, and total shipments, 1985-87, January-March 1987, and January-March 1988

* * * * *

Counsel for Comalco has written to indicate that Comalco has no plans to begin or expand production capacity for calcined bauxite proppants. On the contrary, Comalco decided more than a year ago to exit the proppant business

(Comalco has not produced the subject product since * * *). Counsel for the Australians has also indicated that * * *.

* * * * *

Importer's inventories

The available data on the U.S. importer's inventories of imports of calcined bauxite proppants from Australia are presented in table 19.

Table 19

Calcined bauxite proppants: Inventories of Australian produced merchandise, by inventory site, 1985-87, January-March 1987, and January-March 1988

* * * * *

The U.S. importer's reported inventories of calcined bauxite proppants decreased steadily from *** pounds on December 31, 1985, to *** pounds on December 31, 1987, or by *** percent. Inventories on March 31, 1988, amounted to *** pounds, a decrease of *** percent compared with the level of inventories on March 31, 1987.

Counsel for Comalco has indicated that as of July 1, 1988, U.S. inventories of calcined bauxite proppants held by the U.S. importer had decreased to approximately *** pounds; thus, approximately *** pounds of Australian product had been shipped to U.S. customers during April-June 1988. It was also reported that Comalco * * *.

Consideration of the Causal Relationship Between Allegedly LTFV Imports and the Alleged Material Injury or Threat Thereof

U.S. imports

Data on U.S. purchases of imports of calcined bauxite proppants from Australia are presented in table 20. The data presented were compiled from responses to the Commission questionnaire by four U.S. purchasers that accounted for all imports during the period of investigation.

Table 20

Calcined bauxite proppants: U.S. purchases of imports from Australia, 1985-87, January-March 1987, and January-March 1988

* * * * *

U.S. purchases of imports of all calcined bauxite proppants decreased from *** pounds, valued at \$*** in 1985, to *** pounds, valued at \$*** in 1987, or a decrease of *** percent in quantity and a decrease of *** percent in value. Purchases of imports of calcined bauxite proppants during January-March 1988 amounted to *** pounds, valued at \$***, an increase of *** percent in quantity compared with the amount purchased during * * *. The unit value (per pound) of U.S. purchases of imports of calcined bauxite proppants was *** cents in 1985, falling to *** cents during 1987 and January-March 1988.

Several factors have been mentioned for the lack of purchases of the subject product * * *, including the uncertainties created by litigation concerning the Exxon use patent, and the shift to intermediate strength proppants as fewer deeper and more intermediate depth wells were drilled when oil and gas prices declined.

Market penetration of imports

Shares of apparent consumption accounted for by purchases of imports of calcined bauxite proppants are presented in table 21. The data presented in the table were compiled from purchasers' responses to the Commission's questionnaires. Purchasers' responses have been used to calculate apparent consumption in order to more accurately measure the impact of imports of the subject product on consumption. This is due to the fact that * * *.

Table 21

Calcined bauxite proppants: Apparent U.S. consumption, 1985-87, January-March 1987, and January-March 1988

* * * * *

Purchases of imports of all calcined bauxite proppants accounted for *** percent of the U.S. market in 1985. * * *. Purchases during 1987 accounted for *** percent of total apparent consumption, all of which occurred during * * *. Purchases of imports during January-March 1988 accounted for *** percent of consumption, while there were * * *.

Prices

Demand for the major types of proppants -- sand, resin coated sand, and bauxite -- is a function of the level of gas and oil drilling activity in the United States. With the collapse of oil and gas prices in 1985-86, well-drilling activity declined and lowered the demand for proppants. Demand for a specific proppant will depend on the performance characteristics of the proppant (e.g. crush strength and conductivity), the environment in which the material will be used, and the price. Shallow wells generally use only sand proppants because higher strengths are not necessary for these wells, and

because of sand's low cost (reportedly 1/10th that of bauxite). 1/ Deep wells typically use only bauxite proppants because these wells require added strength. Intermediate-depth wells have typically used all three types of proppants.

Demand for the subject bauxite proppants depends on the number of deep wells being drilled and on new applications for the bauxite proppant. Although the number of deep wells being drilled has declined since 1985, bauxite proppants are now being used in the fractures in higher concentrations per square foot in order to prevent flowback.

Bauxite proppants are sold to oil and gas service companies on a per pound basis. The service companies in turn use these proppants in fracture operations for the oil and gas end user. Although the proppant is sold to the service company, it is delivered directly to the end user. Order lead times are generally less than 2 days. U.S. producers quote their prices f.o.b. factory, although they typically equalize freight with the domestic mill nearest the specific customer. The U.S. importer quotes its prices f.o.b. warehouse, but does not equalize freight. Transportation costs range between 0.5 cents per pound to 3.5 cents per pound.

The price of bauxite proppants depends on the specific strength and the weight of the proppant. 2/ Higher strength and heavier bauxite proppants such as sintered bauxite are generally more expensive than intermediate-strength and lighter weight bauxite proppants. Moreover, users of sintered bauxite proppants are assessed an Exxon users fee of approximately 2 to 6 cents per pound, depending on well depth. Discounts are generally not available to the service companies, although on large jobs U.S. producers reported that they will reduce the transportation charge thereby lowering the delivered price.

Jesse Orsini, President of Carbo Ceramics, stated at the conference that the market for bauxite proppants has shifted toward intermediate-strength and low-density bauxite proppants. 3/ Carbo Ceramics produces an intermediate-strength bauxite proppant, Carbo-Prop, and a low-density/intermediate-strength bauxite proppant, Carbo-Lite. Norton-Alcoa also produces an intermediate-strength bauxite proppant, InterProp Plus. Because Norton-Alcoa lacked a low-density product to compete with Carbo-Ceramic's Carbo-Lite, it offered InterProp I, an intermediate-strength bauxite proppant, and priced this product competitively with Carbo-Lite. 4/

The Australian product being sold in the United States, Dura-Prop, is a high-strength sintered bauxite proppant. Orsini stated that he believed that the Australians had to price Dura-Prop lower than the domestic intermediate proppant in order for Dura-Prop to be competitive in the U.S. market. 5/ In Comalco's postconference brief, the pricing policy for Dura-Prop was stated to

1/ TR, p. 21.

2/ See section entitled "The product" for an explanation of the various types and characteristics of the ceramic products being offered.

3/ TR, pp. 45-47.

4/ Telephone interview with * * *.

5/ Orsini remarked at the conference that "No one was buying sintered bauxite ... [because] its still heavier by weight, it still carries an Exxon royalty, an additional charge. So you don't need it." TR, p. 54.

be calculated to compete on a "value to the customer" basis, taking into account its performance characteristics, specific gravity, and the royalty payments due to Exxon. 1/

* * * have sold directly to the oil and gas end user. * * *. Service companies do not like direct sales to end users because it substantially reduces the margin that service companies receive by reselling the proppant to the end user. Service companies have threatened proppant producers that if they sell directly to an end user, they may cut off their share of business. If the end user does purchase the proppant directly, the service company will still perform the fracture operation, but will charge the end user an additional pumping fee to compensate the service company for the loss of the proppant resale. This pumping fee, however, is considerably less than the margin added to the proppant by the service company. 2/

The price offered to the end user by the service company is for the whole fracture job. The end user may require a specific proppant or they may let the service company make the decision. The service company generally will offer various proppants to the end user and may discount the overall price depending on the type of proppant selected. The service company purchases the proppant after a sale is made to the end user. Therefore, it generally purchases the bauxite proppant on a per job basis. Only between *** percent and *** percent of domestic sales are legally binding written contracts that fix price or quantity for multiple-shipment sales. 3/

Questionnaire price data

The Commission requested U.S. producers and importers of bauxite proppants to provide quarterly price data from January 1985 through March 1988 for three bauxite proppant products. Each product selected represented a specific type of bauxite proppant: high strength, intermediate strength, and low density/intermediate strength. For each product, producers and importers were asked to report the total delivered selling price and the f.o.b. (U.S. location) price for their largest shipment in each quarter. The specified products for which price data were requested are listed below:

Product 1: Low-density/intermediate-strength bauxite/ceramic proppants with mesh size of 20/40.

Product 2: Intermediate-strength sintered bauxite/ceramic proppants with mesh size of 20/40.

Product 3: High-strength sintered bauxite/ceramic proppants with mesh size of 20/40.

Two U.S. producers and one U.S. importer reported price data during the investigation. The U.S. producers accounted for 100 percent of all reported domestic shipments of bauxite proppants. Their shipments of products 1, 2, and 3 accounted for *** percent of the total reported U.S. producers' shipments of

1/ Comalco's postconference brief, p. 4.

2/ Telephone interview with * * *.

3/ * * *.

bauxite proppants in 1987; product 1 accounted for *** percent, product 2 accounted for *** percent, and product 3 accounted for *** percent. The U.S. importer accounted for 100 percent of total U.S. imports of the Australian bauxite proppant. * * *

U.S. producers' price trends.--U.S. producers reported that the primary reason for the decline in prices for bauxite proppants during 1985-86 was the collapse of the U.S. oil and gas industry during this period. Oil prices declined by 58 percent and gas prices declined by 33 percent from the first quarter of 1985 to the third quarter of 1986. ^{1/} Demand for bauxite proppants declined and U.S. producers reduced their prices. Norton-Alcoa reported that * * * bauxite products. Since purchasers generally consider the types of bauxite proppants substitutable, * * *.

U.S. producers' quarterly weighted-average selling prices generally fell for all three products, although prices did increase somewhat at the end of the period of investigation (table 22). For product 1, prices fell by *** percent from January-March 1985 to January-March 1987, from *** cents per pound to *** cents per pound. Over the next three quarters, prices increased to *** cents per pound, before declining in the first quarter of 1988 to *** cents per pound.

Table 22

Calcined bauxite proppants: Weighted-average net delivered selling prices of product 1, 2, and 3 reported by U.S. producers and importers of Australian calcined bauxite proppants, by quarters, January 1985-March 1988

* * * * *

U.S. producers' prices for product 2 were also lower in 1988 than in 1985, however, they fluctuated during most of the period of investigation. Prices generally fell in 1985 and the first quarter of 1986, by a total of *** percent from *** cents per pound to *** cents per pound. Over the next six quarters, prices were within *** cents per pound, before climbing at the end of the period to *** cents per pound.

For product 3, U.S. producers' prices fluctuated in 1985, declined in the first three quarters of 1986, then increased in five of the next six quarters. Prices were *** percent lower in January-March 1988 than in January-March 1985, though they had increased by *** percent over the last three quarters of the period of investigation.

U.S. importer's price trends.--Tresco Sales, the U.S. importer of the Australian proppant, reported that only product *** was sold in the United States during the period of investigation and only in * * *. The importer's selling price for product *** was *** percent less for sales reported in 1987-88 than in 1985.

^{1/} U.S. Department of Energy Monthly Energy Review.

* * * believed that * * * between 1985 and 1987 was due to two factors: the litigation with Exxon over the royalty fees and the fact that the service companies were not passing the Australian product price through to the end user. Rather, the service companies were pricing the Australian bauxite product in relation to the other high-strength sintered bauxite proppants which were more costly than the intermediate strength proppants. Comalco reported in its postconference brief that it was only when Comalco began to approach end users directly in late 1987 did the service companies begin to purchase the imported product in any quantity. * * * the service companies did not offer any significant price difference between the Australian and domestic product until the fourth quarter of 1987.

* * * comments that the price decline of *** percent in the fourth quarter of 1987 is misleading. He asserts that the price decline has been a gradual process over the entire period of investigation. However, * * * responds that he was quoted a price of *** cents per pound for the Australian product in February 1987.

Price comparisons.--Since purchasers have reported during this investigation that bauxite proppants compete against each other in many applications, prices for the Australian proppant were compared with all three U.S.-produced products. In each case, the Australian import was less expensive than the domestic product. In the fourth quarter of 1985, the Australian import ranged between *** cents per pound and *** cents per pound (***-*** percent) less expensive than the U.S.-produced proppants. In the fourth quarter of 1987, the price for the Australian proppant ranged between *** cents per pound and *** cents per pound (***-*** percent) less expensive than the U.S.-produced bauxite proppant. And in the first quarter of 1988, the price for the Australian proppant ranged between *** cents per pound and *** cents per pound (***-*** percent) less expensive than the U.S.-produced bauxite proppant.

Exchange rates

Nominal and real exchange-rate indexes for the U.S. dollar and the Australian dollar are presented in table 23. The currency of Australia fluctuated relative to the U.S. dollar through 1986, before slightly appreciating for the rest of the period. Overall, the Australian dollar appreciated relative to the U.S. dollar by approximately 4.8 percent during January 1985-March 1988. A 22.0-percent inflation rate in Australia, compared with a 1.2-percent inflation rate in the United States during this period, resulted in an appreciation of 26.3 percent in the real value of the Australian dollar relative to the U.S. dollar by March 1988.

Lost sales 1/

Eight allegations of lost sales involving four purchasers were supplied by two U.S. producers of bauxite proppants. The petitioner, Carbo Ceramics, specified *** allegations of lost sales involving *** pounds, but was unable to specify any dollar amount. The other U.S. producer, Norton-Alcoa, supplied ***

1/ U.S. producers did not report any allegation of lost revenues.

Table 23

Indexes of the nominal and real exchange rates between the U.S. dollar and the Australian dollar, 1/ and indexes of producer prices in the United States and Australia, 2/ by quarters, January 1985-March 1988

(January-March 1985=100)				
Period	Nominal exchange- rate index	Real exchange- rate index	U.S. Producer Price Index	Australian Producer Price Index
1985:				
Jan.-Mar....	100.0	100.0	100.0	100.0
Apr.-June...	94.4	97.1	100.1	103.0
July-Sept...	100.4	105.8	99.4	104.8
Oct.-Dec....	96.6	102.2	100.0	105.8
1986:				
Jan.-Mar....	101.0	110.2	98.5	107.5
Apr.-June...	96.6	106.9	96.6	106.9
July-Sept...	89.0	101.5	96.2	109.7
Oct.-Dec....	94.3	110.0	96.5	112.6
1987:				
Jan.-Mar....	100.0	117.2	97.7	114.5
Apr.-June...	102.2	119.6	99.2	116.1
July-Sept...	102.0	119.9	100.3	117.9
Oct.-Dec....	102.5	122.1	100.8	120.1
1988:				
Jan.-Mar....	104.8	126.3	101.2	<u>3/</u> 122.0

1/ Based on exchange rates expressed in U.S. dollars per Australian dollar.

2/ The real exchange-rate index is derived from the nominal exchange rates adjusted by the producer price indexes of each country. These indexes are derived from line 63 of the International Financial Statistics.

3/ Based on January estimate.

Source: International Monetary Fund, International Financial Statistics, June 1988.

allegations of lost sales involving *** pounds for \$***. Staff contacted all four purchasers during the investigation.

As stated earlier, service companies will only purchase the proppant if they make a sale to an end user. Therefore, both U.S. producers expressed difficulty in supplying information on these alleged lost sales because the service company deals with the end user and not the U.S. producer. Moreover, it is generally the end user who determines which proppant product to purchase. The dollar figure supplied by Norton-Alcoa reflects what its list price was at the time of the alleged lost sales.

* * * was named in *** allegations of lost sales by the two U.S. producers. Carbo Ceramics cited * * *, and Norton-Alcoa cited * * *.

* * * stated that * * * did purchase the Australian product in * * * . ^{1/} However, * * * argues that * * * 's purchases of the Australian product could not have been any domestic producer's lost sale because each purchase was made at the request of the customer. There was no bid process for these purchases, and * * * did not reject any U.S.-producer's quotes. * * * commented that * * * did not know the reason behind the customers' selection of the Australian proppant, but assumes that the reason was ultimately determined on price.

* * * stated that three factors determine from whom they purchase the bauxite proppant -- customer preference, availability, and price. * * * did not purchase the Australian product in 1986-87 because of litigation with Exxon concerning patent infringement by the Australian proppant.

* * * was cited in *** allegations of lost sales by the two U.S. producers. * * * .

* * * could not recall the specific lost sales, stating that he purchases whatever product his district sales and marketing people request. He commented that he had no knowledge of why his salesmen requested the Australian product. * * * did not purchase any Australian product in * * * . * * * remarked that the factors they use in their purchasing decisions for proppants are contractual commitments, price, service, quality, and customer preference.

* * * was named by * * * in a lost sale involving *** pounds that occurred in * * * . * * * stated that he has made only *** purchases of the Australian product. * * * purchased *** pounds in * * * , and *** pounds in * * * . * * * purchases were made at the customer request and came after * * * lost previous sales to these customers because * * * did not offer the Australian proppant that was at a lower price.

* * * was named by * * * in a lost sale involving *** pounds in * * * of * * * . * * * was contacted by staff, but has not responded to the allegation at the time of this report.

APPENDIX A

COMMERCE'S AND THE COMMISSION'S FEDERAL REGISTER NOTICES

[A-602-801]

Initiation of Antidumping Duty Investigation; Calcined Bauxite Proppants From Australia

AGENCY: Import Administration, International Trade Administration, Department of Commerce.

ACTION: Notice.

SUMMARY: On the basis of a petition filed in proper form with the U.S. Department of Commerce, we are initiating an antidumping duty investigation to determine whether imports of calcined bauxite proppants from Australia are being, or are likely to be, sold in the United States at less than fair value. We are notifying the U.S. International Trade Commission (ITC) of this action so that it may determine whether imports of CBP materially injure, or threaten material injury to, a U.S. industry. If this investigation proceeds normally, the ITC will make its preliminary determination on or before July 29, 1988. If that determination is affirmative, we will make a preliminary determination on or before November 21, 1988.

EFFECTIVE DATE: July 12, 1988.

FOR FURTHER INFORMATION CONTACT: Charles Wilson, Office of Investigations, Import Administration, International Trade Administration, U.S. Department of Commerce, 14th Street and Constitution Avenue NW., Washington, DC 20230; telephone (202) 377-5268.

SUPPLEMENTARY INFORMATION:**The Petition**

On June 14, 1988, we received a petition filed in proper form by Carbo Ceramics, Inc. on behalf of the domestic CBP industry. In compliance with the filing requirements of 19 CFR 353.36, petitioner alleges that imports of CBP from Australia are being, or are likely to be, sold in the United States at less than fair value within the meaning of section 731 of the Tariff Act of 1930, as amended (the Act), and that these imports materially injure, or threaten material injury to, a U.S. industry.

The petitioner has alleged that they have standing to file the petition. Specifically, petitioner has alleged that

they are an interested party as defined under section 771(9)(C) of the Act, and that they have filed the petition on behalf of the U.S. industry manufacturing the product that is subject to this investigation.

If any interested party as described under paragraphs (C), (D), (E), or (F) of section 771(9) of the Act wishes to register support of or opposition to this petition, please file written notification with Commerce official cited in the "FOR FURTHER INFORMATION CONTACT" section of this notice.

United States Price and Foreign Market Value

Petitioner's estimate of United States price was based on prices for CBP produced in Australia and sold in the United States, less foreign inland freight, ocean freight, marine insurance, and U.S. brokerage and handling.

Petitioner's estimate of foreign market value was based on Australia home market prices.

Based on a comparison of United States prices and foreign market value, petitioner alleges dumping margins of approximately 64 to 86 percent.

Initiation of Investigation

Under section 732(c) of the Act, we must determine, within 20 days after a petition is filed, whether it sets forth the allegations necessary for the initiation of an antidumping duty investigation, and whether it contains information reasonably available to the petitioner supporting the allegations.

We examined the petition on CBP from Australia and found that it meets the requirements of section 732(b) of the Act. Therefore, in accordance with section 732 of the Act, we are initiating an antidumping duty investigation to determine whether imports of CBP from Australia are being, or are likely to be, sold in the United States at less than fair value. As part of this investigation, we will determine whether the products under investigation are being sold in the home market at less than the costs of production. If our investigation proceeds normally, we will make our preliminary determination by November 21, 1988.

Scope of Investigation

The United States has developed a system of tariff classification based on the international harmonized system of Customs nomenclature. Congress is considering legislation to convert the United States to this Harmonized System (HS). In view of this proposal, we will be providing both the appropriate Tariff Schedules of the

United States Annotated (TSUSA) item numbers and the appropriate HS item numbers with our product descriptions on a test basis, pending Congressional approval. As with the TSUSA, the HS item numbers are provided for convenience and Customs purposes. The written description remains dispositive.

We are requesting petitioners to include the appropriate HS item number(s) as well as the TSUSA item number(s) in all new petitions filed with the Department. A reference copy of the proposed HS schedule is available for consultation at the Central Records Unit, Room B-099, U.S. Department of Commerce, 14th Street and Constitution Avenue NW., Washington, DC 20230. Additionally, all Customs offices have reference copies and petitioners may contact the Import Specialist at their local Customs office to consult the schedule.

The product covered by this investigation is calcined bauxite proppants from Australia currently provided for under TSUSA item number 521.1720 and currently classifiable under HS item number 2606.00.00.60. The subject merchandise is used in oil and gas wells to cause hydraulic fracturing to promote product extraction.

Notification of ITC

Section 732(d) of the Act requires us to notify the ITC of this action and to provide it with the information we used to arrive at this determination. We will notify the ITC and make available to it all nonprivileged and nonproprietary information. We will allow the ITC access to all privileged and business proprietary information in our files, provided it confirms in writing that it will not disclose such information either publicly or under administrative protective order without the written consent of the Assistant Secretary for Import Administration.

Preliminary Determination by ITC

The ITC will determine by July 29, 1988, whether there is a reasonable indication that imports of CBP from Australia materially injure, or threaten material injury to, a U.S. industry. If its determination is negative, the investigation will terminate; otherwise, it will proceed according to the statutory and regulatory procedures.

This notice is published pursuant to section 732(c)(2) of the Act.

Jan W. Mares,

Assistant Secretary for Import Administration.

July 5, 1988.

[FR Doc. 88-15582 Filed 7-11-88; 8:45 am]

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As provided in section 733(a) of the act, the Commission must complete preliminary antidumping investigations in 45 days, or in this case by July 29, 1988.

For further information concerning the conduct of this investigation and rules of general application, consult the Commission's Rules of Practice and Procedure, part 207, subparts A and D (19 CFR part 207), and part 201, subparts A through E (19 CFR part 201).

EFFECTIVE DATE: June 14, 1988.

FOR FURTHER INFORMATION CONTACT: Diane Mazur (202-252-1164), Office of Investigations, U.S. International Trade Commission, 500 E Street SW., Washington, DC 20436. Hearing-impaired individuals are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on 202-252-1810. Persons with mobility impairments who will need special assistance in gaining access to the Commission should contact the Office of the Secretary at 202-252-1000.

SUPPLEMENTARY INFORMATION:

Background.—This investigation is being instituted in response to a petition filed on June 14, 1988, by Carbon Ceramics, Inc., Irving, TX.

Participation in the investigation.—Persons wishing to participate in this 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 seven (7) 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, who are parties to this investigation upon the expiration of the period for filing entries of appearance. In accordance with § 201.16(c) and 207.3 of the rules (19 CFR 201.16(c) and 207.3), 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.

Conference.—The Director of Operations of the Commission has scheduled a conference in connection

INTERNATIONAL TRADE COMMISSION

(Investigation No. 731-TA-411
(Preliminary))

Calcined Bauxite Proppants From Australia; Import Investigations

AGENCY: United States International Trade Commission.

ACTION: Institution of a preliminary antidumping investigation, and scheduling of a conference to be held in connection with the investigation.

SUMMARY: The Commission hereby gives notice of the institution of preliminary antidumping investigation No. 731-TA-411 (Preliminary) under section 733(a) of the Tariff Act of 1930 (19 U.S.C. 1673(a)) to determine whether there is a reasonable indication that an industry in the United States is materially injured, or is threatened with material injury, or the establishment of an industry in the United States is materially retarded, by reason of imports of calcined bauxite proppants from Australia, provided for in item 521.17 of the Tariff Schedules of the United States Annotated (TSUSA), that are alleged to be sold in the United States at less than fair value.¹

¹ The subject articles are provided for in subheading 2814.60.00 of the proposed Harmonized Tariff Schedule of the United States.

with this investigation for 9:30 a.m. on July 5, 1988 at the U.S. International Trade Commission Building, 500 E Street SW., Washington, DC. Parties wishing to participate in the conference should contact Diane Mazur (202-252-1184) not later than June 28, 1988, to arrange for their appearance.

Written submissions.—Any person may submit to the Commission on or before July 8, 1988, a written statement of information pertinent to the subject of the investigation, as provided in § 207.15 of the Commission's rules (19 CFR 207.15). 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 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 information for which confidential treatment is desired must 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).

Authority: This investigation is being conducted under authority of the Tariff Act of 1930, title VII. This notice is published pursuant to § 207.12 of the Commission's rules (19 CFR 207.12).

By order of the Commission.

Issued: June 21, 1988.

Kenneth R. Mason,

Secretary.

[FR Doc. 88-14324. Filed 6-23-88; 8:45 am]

BILLING CODE 7020-02-M

APPENDIX B
CALENDAR OF PUBLIC CONFERENCE

CALENDAR OF THE PUBLIC CONFERENCE

July 5, 1988

Investigation No. 731-TA-411 (Preliminary)

CALCINED BAUXITE PROPPANTS FROM AUSTRALIA

Those persons listed below appeared at the United States International Trade Commission's conference held in connection with the subject investigation on July 5, 1988, at the U.S. International Trade Commission, 500 E Street, SW, Washington, DC.

In support of the imposition of antidumping duties

Scott C. Whitney--Counsel
Bentonville, VA
on behalf of--

Carbo Ceramics, Inc.

Jesse P. Orsini, President

Scott C. Whitney --OF COUNSEL

In opposition to the imposition of antidumping duties

No interested party requested to appear.

UNITED STATES
INTERNATIONAL TRADE COMMISSION
WASHINGTON, D.C. 20436

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