

scientific value to the foreign article, for such purposes as this article is intended to be used, is being manufactured in the United States.

Reasons: The foreign article as deposited capacitive pads to  $\lambda/200$  flatness. The National Bureau of Standards advises in its memorandum dated January 11, 1982 that (1) the capability of the foreign article described above is pertinent to the applicant's intended purpose and (2) it knows of no domestic instrument or apparatus of equivalent scientific value to the foreign article for the applicant's intended use.

The Department of Commerce knows of no other instrument or apparatus of equivalent scientific value to the foreign article, for such purposes as this article is intended to be used, which is being manufactured in the United States.

(Catalog of Federal Domestic Assistance Program No. 11.105, Importation of Duty-Free Educational and Scientific Materials)

Frank W. Creel,

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### Investigation of Imports of Glass-Lined Chemical Processing Equipment

**AGENCY:** Office of Industrial Resource Administration, International Trade Administration, Commerce.

**ACTION:** Investigation under Section 232 of the Trade Expansion Act of 1962, as amended (19 U.S.C. 1862) to determine the effects on the national security of imports of glass-lined chemical processing equipment has been completed.

**SUMMARY:** An investigation was completed under section 232 of the Trade Expansion Act of 1962, as amended (19 U.S.C. 1862), to determine the effects on the national security of imports of glass-lined chemical processing equipment. It was found that glass-lined chemical processing equipment is not being imported into the United States in such quantities or under circumstances as to threaten to impair the national security. A final report which included company confidential information was sent to the President by the Secretary of Commerce on March 12, 1982. All company confidential information has been deleted from this public report.

#### Background

On March 13, 1981, the Department of Commerce received and accepted an application from Ceramic Coating

Company, Newport, Kentucky, requesting that a national security investigation be initiated to determine the effect of imports of glass-lined chemical processing equipment on the national security.

The application from Ceramic Coating Company was accepted and a notice was published in the *Federal Register*, 46 FR 45977, September 16, 1981, advising the public that an investigation was being conducted under the authority of Section 232, of the Trade Expansion Act of 1962, as amended (19 U.S.C. 1862). Interested parties were invited to submit written comments. The applicant alleged that an increasing share of the domestic market for glass-lined chemical processing equipment is being taken by France. The applicant also alleged that "a reduction in domestic production capacity caused by imports will adversely effect (sic) the national security".

The investigation was undertaken in accordance with International Trade Administration Regulation 15 CFR 359, "Effect of Imported Articles on the National Security".

#### Public Comments

A comment was received pertaining to this investigation from one firm. This comment, which can be summarized as "In the event of an interruption domestic purchasers could meet their needs through other options", was taken into consideration by the Department of Commerce in the course of the investigation.

The public report of the investigation follows.

#### FOR FURTHER INFORMATION CONTACT:

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Dated: March 1982.

Vincent F. DeCain,

Acting Deputy Assistant Secretary for Export Administration.

#### Table of Contents

##### Executive Summary

##### Findings, Conclusions and Recommendation:

##### I. Introduction

- A. Purpose of a National Security Impact Investigation
- B. Legal Authority
- C. Critical Factors of an Investigation
- D. Conduct of an Investigation

##### II. Investigation of Imports of Glass-Lined Chemical Processing Equipment

- A. Background
  1. Prior Related Investigations
  2. Elements of this Investigation
  3. Structure of this Investigation
- B. Description of the Industry
  1. The Product

2. Manufacturing Method
3. Nature of the Industry in the U.S.
  - a. Manufacturers and Reglacers
  - b. Company Structure
  - c. Capital Costs
  - d. Inventories
  - e. Susceptibility to General Economic Conditions
4. End-Users and Consumption Patterns
  - a. Drugs—Pharmaceuticals
  - b. Chemicals
5. Industry Sales Patterns 1975-1980
  - a. U.S. Shipments
  - b. Exports
  - c. Imports
  - d. U.S. Tariff Treatment
6. Employment
7. Competition From Substitute Materials
8. Capacity and Utilization

#### III. Findings

##### A. Vulnerability of the Industry

1. Relationship to the National Security
2. Effect of Current Economic Conditions
3. Limits to Production
4. Foreign Competition
5. Financial Assistance

##### B. Costs of Protecting this Industry

1. Economic Costs
2. Foreign Policy Consideration

Note.—Company confidential information is deleted by asterisks.

#### Executive Summary

Under the authority of Section 232 of the Trade Expansion Act of 1962, as amended (19 U.S.C. 1862), the Secretary of Commerce investigated the impact on the national security of imports of glass-lined chemical processing equipment.

Glass-lined chemical processing equipment is not being imported into the United States in such quantities or under circumstances as to threaten to impair the national security.

No action is deemed necessary to adjust the imports of glass-lined chemical processing equipment.

We have concluded that imports have neither reduced U.S. productive capacity to make this equipment, nor significantly reduced the number of skilled workers, nor affected adversely materials necessary to assure national requirements for this equipment during periods of emergency.

The manufacturing industry which fabricates glass-lined chemical processing equipment in the United States is mature and highly competitive but in a state that reflects the current sluggishness of all industry (\* \* \*).<sup>1</sup> Its products are vital to the national welfare and security of the United States. The equipment is critical in the production of drugs and chemicals. In the event of a mobilization, additional domestic production capacity for glass-lined chemical processing equipment is not needed.

Three firms have production facilities in the U.S. \* \* \*. Keen competition for the market has kept prices down and quality up. Imports have been a favorable factor by providing the chemical processing industry with continued high quality products at reasonable prices from both domestic and foreign sources.

Those agencies consulted, including the Department of Defense, agree with the Department of Commerce finding that U.S. industrial capacity currently is not seriously impacted by imports and that our mobilization readiness and national defense needs are and should be adequately served by the domestic industry as it exists today.

This report analyzes the structure of the equipment manufacturing industry, the major users of the equipment, the importance of the equipment for the enhancement and integrity of products and its importance to the national welfare and security.

## I. Introduction

### A. Purpose of an Investigation

An import impact investigation is conducted to determine the effect of the import of any article, good or commodity on the national security. An investigation includes examination of the effects of imports on all phases of U.S. productive capacity necessary to meet a selected emergency scenario, as well as other factors related to national security.

Based on this report, the Secretary of Commerce will present the findings and recommendations to the President, who will determine what action, if any, is necessary to adjust the import of these products so that they do not threaten the national security.

### B. Legal Authority

1. The Law. Under Section 232 of the Trade Expansion Act of 1962, as amended (19 U.S.C. 1862)<sup>2</sup> the Secretary of Commerce, in consultation with the Secretary of Defense and other appropriate agencies, has the responsibility to conduct an investigation to determine the effect on the national security of imports of any article which may be the subject of a specific request by the head of any department or agency, by request of an interested party, or upon his own motion.

<sup>2</sup>See appendix filed as part of the original document.

This function was transferred to the Secretary of Commerce from the Secretary of Treasury by Reorganization Plan No. 3 of 1979 (44 FR 69273) and as provided by Executive Order 12188 of January 2, 1980. The effective date of the transfer was January 2, 1980.

2. The Regulations. To properly administer the responsibilities under the statute, regulations were promulgated prescribing procedures to be followed by the Department of Commerce to commence and conduct an investigation to determine the effect on the national security of the imports of any article. These regulations are found in Title 15, Code of Federal Regulations, Part 359, "Effects of Imported Articles on the National Security."<sup>3</sup>

The regulations include requirements for the initiation of the investigation, the criteria for determining the effects of imports of the article on the national security, guidance to applicants as to the filing and content of requests and applications for investigations, the conduct of an investigation, the Secretary's report to the President, and the public availability of the record of the investigation.

### C. Critical Factors of an Investigation

The regulations require that certain criteria be used to determine the effect of imports on the national security. They include:

(a) Requirements of the direct defense, indirect defense and essential civilian sectors;

(b) Domestic production needed for projected national defense needs;

(c) Capacity of domestic industries to meet projected national defense needs;

(d) Existing and anticipated availability of labor (skilled and unskilled), raw materials, products, production equipment and facilities, and other supplies and services essential to the national defense.

(e) Growth requirements of domestic industries to meet national defense requirements;

(f) Quantity, quality and availability of imports;

(g) Impact of foreign competition on the economic welfare of the essential domestic industry;

(h) Serious effects of imports on the possible displacement of domestic products, unemployment, decrease in revenues to the government, loss of investments, loss of specialized skills and loss of productive capacity;

<sup>3</sup>See appendix.

(i) Any other relevant factors that may weaken our national economy; and

(j) Other factors relevant to national security in light of the peculiarities of each case.

Further, each criterion is applied within the limits of a selected scenario developed by the Department of Defense. Details of the emergency mobilization levels established by the scenario (classified) provide the Secretary of Commerce with specific industry requirements based on industrial data acquired by other agencies.

In addition, the total impact of the proposed action or inaction must be investigated. This includes foreign policy considerations, international trade policy, and procurement agreements.

Finally, it should be understood that the purpose of a Section 232 investigation is to safeguard the security of the nation, not the economic welfare of a company or an industry, except as that welfare may affect the national security.

### D. Conduct of an Investigation

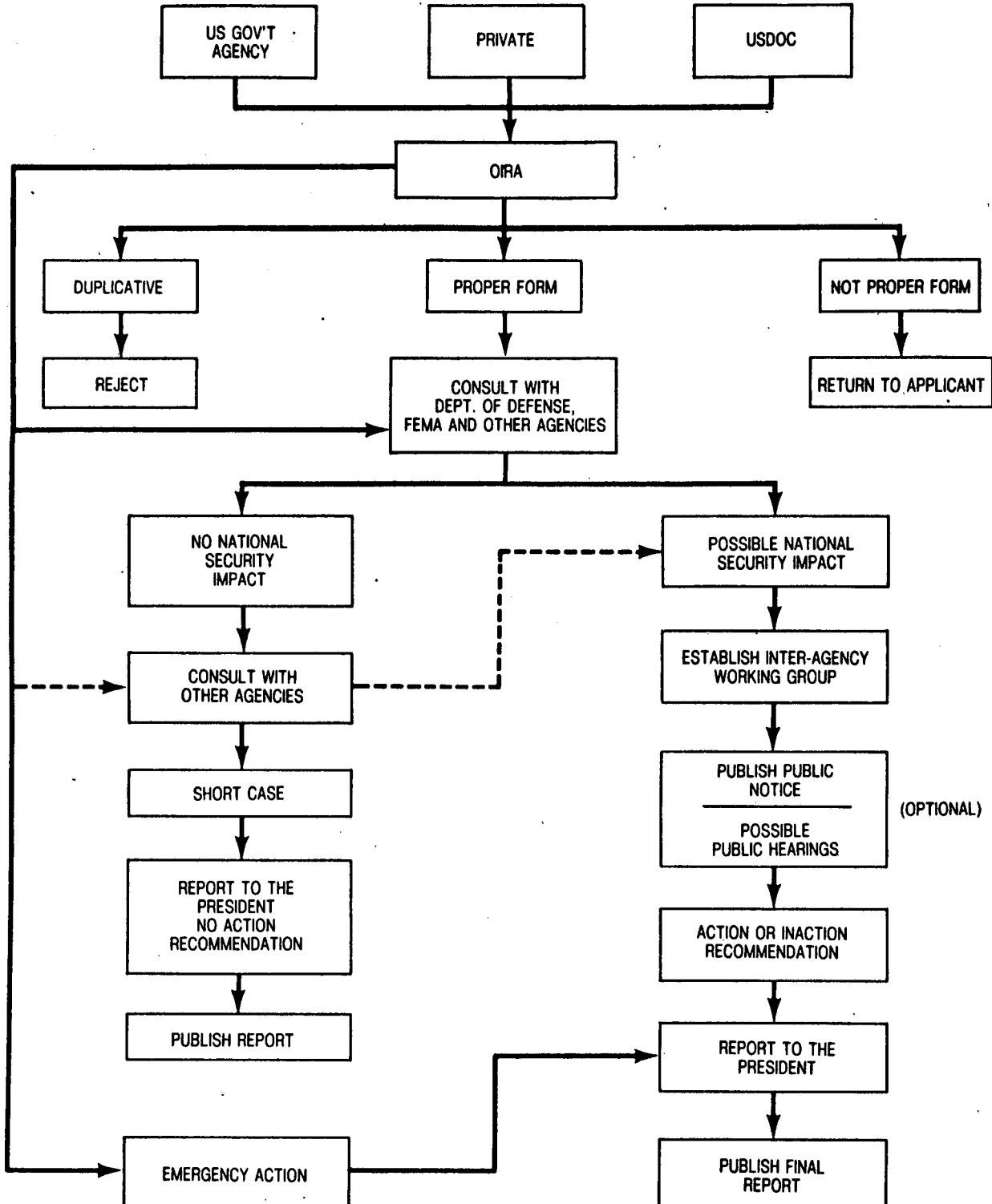
When an application to request an investigation is received by the Department of Commerce from another agency or department, or from an interested party, the regulations (15 CFR 359) require that the Department shall consult with the Department of Defense and other appropriate officers of the U.S. to determine the effect on the national security of the imports of the article in question. The Department may afford the public an opportunity to comment and present information and advice relevant to the application, if appropriate.

From that point forward, the Department will convene an interagency panel for detailed consultations and prepare a report to the President following the guidelines in the regulations and the statutes. A final report will be published in the Federal Register upon disposition of each request for an investigation.

A flow chart outlining the steps to be followed in the investigation is presented as follows:

**U.S. Department of Commerce  
Industrial Resource Administration  
Resource Assessment Division**

**SECTION 232 - ACTION FLOW-CHART  
REQUEST FOR AN INVESTIGATION BY:**



## Findings, Conclusions and Recommendation

### Findings

Necessary equipment, supplies, materials, and critical labor for the production of glass-lined chemical processing equipment are available now and will be available in ample quantities in the foreseeable future to meet the nation's needs during a protracted emergency as described in the mobilization scenario.

This investigation has found that the industry is highly sensitive to general economic conditions and that it is currently in transition. \* \* \*. We found two small firms competing with the giant of the domestic industry. A French firm is capturing a share of the U.S. market, \* \* \*. We found that prices are moderating while quality is increasing. We have not found any serious erosion of the U.S. industry.

### Conclusions

1. Glass-lined chemical processing equipment production is important to the national welfare and to the national security.

2. Glass-lined chemical processing equipment is important to user industries to guarantee and maintain product integrity

3. U.S. productive plant capacity for glass-lined chemical processing equipment is vulnerable to new competition and innovations both from domestic and imported products.

4. Domestic producers and importers of glass-lined chemical processing equipment have been hard hit by sluggish economic conditions and higher energy, material and transportation costs.

5. U.S. production capacity for glass-lined chemical processing equipment is adequate for mobilization requirements.

6. Industrial users of glass-lined chemical processing equipment are sensitive first to quality and service and second to price.

7. Industrial users of glass-lined chemical processing equipment have sought out alternative equipment for reliability and cost reduction reasons.

8. Industrial users of glass-lined chemical processing equipment are operating at 75 percent of capacity, and the total 1981 user industry capacity was found to be sufficient for mobilization purposes.

9. Production and exports of glass-lined equipment from friendly countries is considered to be reliable; however, under a full mobilization condition,

shipping losses are estimated to be extensive.

10. During a three-year mobilization scenario, available capacity could be augmented by other facilities and an available or re-trained labor force. This presupposes the imposition of considerable restrictions upon civilian usage of essential equipment.

### Recommendation

This investigation into the effect of imports upon the domestic glass-lined chemical processing equipment industry leads to the recommendation that no direct action is required to limit imports to preserve the domestic producing industry.

## II. Investigation of Imports of Glass-Lined Chemical Processing Equipment

### A. Background

The Department of Commerce began this investigation in March of 1981, at the request of an interested party, to determine the effect in imports of glass-lined chemical processing equipment on the national security, including essential civilian requirements and direct and indirect defense requirements.

An interagency working group headed by the Department of Commerce has examined this specialized industry using the guidelines in Section 232 of the Trade Expansion Act of 1962, as amended (19 USC 1862). The completed report, prepared by the Department of Commerce with input from the working group and industry representatives, follows.

The Ceramic Coating Company of Newport, Kentucky, filed an application with the Department of Commerce requesting an investigation into the effect on the national security of the import of glass-lined chemical processing equipment. This investigation was initiated by the Secretary of Commerce on March 13, 1981, upon acceptance of the application. The investigation was conducted in conformity with the guidelines established in Section 232 of the Trade Expansion Act of 1962, as amended (19 USC 1862) and with the applicable regulations (15 CFR Part 359) as detailed in Section I of this report.

A notice was published in the *Federal Register* (46 FR 45977, September 16, 1981)\* advising the public that an investigation was being conducted under the authority of Section 232 of the Trade Expansion Act of 1962, as amended (19 USC 1862) to determine the effects on the national security of imports of glass-lined chemical

processing equipment. Interested parties were invited to submit written comments.

The applicant, Ceramic Coating Company, alleged that an increasing share of the domestic market for glass-lined chemical processing equipment is being taken by imports from France. This is due, it is alleged, to pricing policies which, in turn, "threaten competition in the United States." The applicant also states that "a reduction in domestic production capacity caused by imports will adversely effect [sic] the national security," and that a French firm, DeDietrich, is supported by "numerous aid programs" of the French government providing pricing advantages. Ceramic Coating Company claims that "deterioration of the domestic industry under these circumstances" endangers the national security and should be investigated.

1. **Prior Investigations Relating to this Industry.** a. R. Gelb & Sons, the predecessor firm to DeDietrich (USA), a reseller of glass-lined chemical processing equipment, encountered difficulties in the late 1960s in selling DeDietrich products in the U.S. due to the refusal of the American Society of Mechanical Engineers (ASME) to certify foreign-made boilers and pressure vessels (ASME certification is a prerequisite to installation of such vessels in 44 states). ASME certification first became available for DeDietrich products in 1972 as a result of a consent decree entered into by ASME in settlement of a 1970 civil antitrust suit filed by the Department of Justice. *United States v. American Society of Mechanical Engineers*.<sup>4</sup>

b. On January 21, 1971, the U.S. Tariff Commission initiated an investigation to determine whether, as a result of concessions granted under trade agreements, articles similar to or directly competitive with the glass-lined chemical process equipment produced by Glascote Products Division, Haveg Industries, Inc., Cleveland, Ohio (no longer a manufacturer of this equipment), were being imported into the United States in such increased quantities as to cause or threaten to cause, the unemployment or underemployment of a significant number or proportion of the workers of the Cleveland plant. The Commission found the *not* to be the case.<sup>5</sup>

The investigation revealed that Glascote lost bids for business primarily

<sup>4</sup> 1972 Trade Cases #74,028 (S.D.N.Y. 1972).

<sup>5</sup> T.C. Publication 370, March 1971. Report to the President on Investigation No. TEA-W-56, under Section 301(c)(2) of the Trade Expansion Act of 1962.

\* See appendix.

to the dominant domestic producer, Pfaudler Company, rather than to importers.

c. A petition was received by the U.S. Department of Commerce on September 15, 1980, from the Pfaudler Company pursuant to Section 303 of the Tariff Act of 1930, as amended by the Trade Agreements Act of 1979, requesting that a countervailing duty be imposed on certain imported glass-lined equipment from France. The petition alleged that benefits available under French law may constitute subsidies within the meaning of Section 701 of the Act, as amended. The petition did not meet the standards established for an investigation and did not provide information as to the value of any subsidies the French firm may have received. The petition was dismissed and the proceedings terminated. On October 7, 1980, the Department of Commerce and the U.S. International Trade Commission closed the case and the preliminary countervailing duty investigation.

**2. Elements of this Investigation.** This investigation focused on the effects imports have had on the health of the domestic industry including the impact on their user industries and thereby examined the effect on the national welfare and the national security.

The investigation included a review of the trends in imports, production and productive capacity of the industry, the types and quantities of equipment required by user industries under normal conditions and what their requirements are estimated to be during national emergencies requiring mobilization.

The impact of imports on industrial capacity, including employment, skilled production workers, the general economy and foreign trade was assessed.

**3. Structure of the Investigation.** The Department of Commerce, in the conduct of its investigation, consulted with the Department of Defense (DOD) and requested the participation of the following agencies: Department of Transportation (DOT), Department of Agriculture, Federal Emergency Management Agency (FEMA), Department of Health and Human Services (HHS), Department of Energy (DOE), Department of Labor, U.S. International Trade Commission (ITC), Department of the Treasury, Department of State, Council of Economic Advisor, Office of the U.S. Trade Representative (USTR), the Central Intelligence Agency (CIA), the Department of Justice and the Office of Management and Budget (OMB). A set of questions was

developed by the Department of Commerce which formed the basis for each agency's contribution.

DOD was asked to provide information on peacetime, surge and full mobilization requirements for direct defense needs and to anticipate the reliability of imports during an emergency.

The Department of Labor identified special skills, human resources, training, availability of special skills from related industries, and the impact of imports on employment.

FEMA supplied the needs of basic industry (indirect defense needs) and the essential civilian requirements during a period of full mobilization.

The Department of Treasury commented on the impact on the economy of foreign currency fluctuations (particularly the French franc) and provided an estimate of loss and/or gain of revenues from imports.

The Department of State supplied information on the potential effect on international relations of restricting imports of these items.

USTR and the Council of Economic Advisors commented on the possible impact on the general economy and on trade transactions should there be an import interruption or a change in tariffs.

The Department of Commerce also prepared an industry questionnaire setting forth the basis for the industrial analyses. Information was gathered from end users, the American Society of Mechanical Engineers (ASME), and manufacturers. Public comments were solicited.

#### *B. Description of the Industry*

1. The Product. Glass-lined chemical processing equipment is special corrosion-resistant production equipment used to produce, process and store chemicals, drugs, and other items.

2. Manufacturing Method. The manufacture and fabrication of glass-lined chemical processing equipment requires special fabricating and materials handling equipment and heat treating furnaces. A special glass powder or frit<sup>6</sup> which is produced by or for the manufacturer to his own formulation, is applied in a series of coats to the inside of specially built steel

products which have been prepared by sandblasting. The vessels are then fired in large furnaces at temperatures of 1400°F to 1700°F.

These temperatures cause the glass to bond physically and chemically with the steel. The resultant coating is hard and smooth and withstands attack from the most severe reactions. The coating is also anti-stick and easy to clean. Such properties make glass-lined chemical processing equipment suitable for the processing and storage of chemicals, drugs, and other items where batch processing and lack of contamination are important.

The manner and method with which a few critical production steps are followed ultimately distinguish one firm's glass-lined product from another's. For example, the glass frit must be formulated so that it can withstand a battery of corrosive elements. Furthermore, equipment must be designed not only to meet customer specifications but also to ensure the proper adherence of glass to the steel shell.

Much of the glass-lined chemical processing equipment is custom-made to the customer's specifications. A customer may demand certain dimensions or may dictate the placement of a nozzle or flange. One manufacturer estimates delivery of custom equipment to be 12 to 60 weeks. The other two manufacturers did not provide estimates.

3. Nature of the Industry. Manufacturing facilities for glass-lined chemical processing equipment are located in the United States, Japan, France, West Germany, East Germany, Mexico, Scotland, Brazil, Hungary, Italy, and Switzerland. With the exception of France, none of these countries export a significant amount of glass-lined equipment to the U.S. The U.S. is dependent upon the production of three domestic firms, Pfaudler (a division of the Sybron Corporation), Ceramic Coating Company, and DeDietrich USA, a wholly-owned subsidiary of the French firm, DeDietrich et Cie.

a. *Manufacturers and Reglassers.* The U.S. and international glass-lined chemical processing equipment market is served by only a few manufacturers who produce various types of equipment and accessory items (some specializing), ranging from reactors and storage tanks to heat exchangers, valves, piping and other items. Principal manufacturers are:

(1) The Pfaudler Company, a division of Sybron Corporation with plants in Rochester, New York; Elyria

<sup>6</sup> Frit is powdered glass. The glass may be composed of up to 20 substances, primarily various oxides, such as silica, feldspar, borax, cobalt, and titanium. The characteristics of the finished glass coating include hardness, corrosion and heat resistance. Since not all of these desired properties can be achieved in one composition, there are many formulations.

(Cleveland), Ohio; Scotland; Mexico; West Germany; and Brazil;

(2) DeDietrich et Cie, France;

(3) DeDietrich USA, Union, New Jersey;

(4) Ceramic Coating Company, Newport, Kentucky;

(5) Estrella, Switzerland;

(6) Lampart Enamel Industry Works, Hungary;

(7) Schwelmer Eisenwerk, Mueller & Company, GMBH, West Germany;

(8) Tycon, SpA, Italy;

(9) Iwaki Glass Company, Japan;

(10) Kobe Steel, Japan (two plants); and

(11) East German firm in Thale (name unknown).

*b. Company Structure.* Pfaudler and Ceramic Coating are the only manufacturers of glass-lined chemical processing equipment to have integrated plants in the U.S. Pfaudler has fabricating, surface finishing and glassing operations in Rochester, New York, and Elyria, Ohio. Ceramic Coating has similar, though smaller, facilities in Newport, Kentucky.

DeDietrich USA's plant in Union, New Jersey, reglasses used equipment, imports finished equipment and glasses some steel equipment purchased from U.S. fabricators and from its parent in France.

*c. Capital Costs.* The major capital outlays to establish an integrated plant are for the glass smelting and product heat treating furnaces and the materials handling (charging boom) equipment. Additional costs include sandblasting chambers, cranes, welding equipment, machine tools, frit mill room and steel rolling and shaping equipment. Buildings to house the plant amount to about 20 percent of cost. An integrated facility may cost \$3-5 million or more.

*d. Inventories.* Inventories are maintained not only as a service to repeat customers but also as a tool to meet anticipated surges in demand. \* \* \*

*e. Susceptibility to General Economic Conditions.* Shipments of process equipment tend to follow trends in capital equipment spending of industrial end users. Consistent with general economic conditions, orders have been sluggish over the past two years. An upswing is likely to occur only when effects of the new tax law and lower interest rates result in capital equipment spending and continued growth of the user industries. The glass-lined chemical processing equipment industry is not considered a "growth" industry since an increasing number of substitute products have reached the market in recent years, particularly for vessels where

dedication to a single product is more likely and the versatility of glass is not needed.

Relative to the overall sales of this industry in 1980 (\* \* \*), entry requires a large investment in specialized equipment and skilled labor.

*4. End Users and Consumption Patterns.* The following industries are the principal users of glass-lined chemical processing equipment in their manufacturing processes. These industries are highly cyclical in response to general economic trends. Currently, they operate at less than capacity (70-75 percent); increases in output would not require additional glass-lined processing equipment. Reglassing, replacement or other maintenance functions are necessary, although they vary with production levels.

*a. Drugs—Pharmaceuticals.*<sup>7</sup> The drug industry manufactures biologicals, medicinals, botanicals, and pharmaceutical preparations. Industry shipments reached \$22.7 billion in 1981, an increase over 1980 of 3.2 percent considering inflation. Drug industry shipments are expected to increase by 3.0 percent in 1982 on a constant dollar basis. The industry had been growing since 1972 at a 4.8 percent rate.

Moderate and steady growth is predicted for the drugs and cosmetic industries in the 1980's. The value of industry shipments of all drugs and pharmaceuticals is forecast to increase at an average annual rate of 3.1 percent from 1981 through 1986, after adjustment for inflation.

*b. Chemicals.*<sup>8</sup> The chemicals and allied products industry showed a modest 2 percent increase in the constant dollar value of shipments during 1981. Poor sales in many chemicals-consuming industries resulted in lower levels of output of chemicals than in previous peak years. The value of shipments of the chemicals and allied products industry will increase 2.4 percent in 1982, after adjusting for inflation.

The chemical industries are the primary users of glass-lined chemical processing equipment for batch processing. Of this group, the specialty chemical and pharmaceutical industries lead in consumption. The equipment required by these industries is outlined below:

<sup>7</sup> From the 1982 U.S. Industrial Outlook, U.S. Department of Commerce, January 1982, pages 132-136.

<sup>8</sup> From the 1982 U.S. Industrial Outlook, U.S. Department of Commerce, January 1982, page 91.

#### FUNCTIONAL APPLICATIONS FOR GLASS-LINED EQUIPMENT IN THE CHEMICAL PROCESSING INDUSTRY

Function	Industry segments	Products
Multiple batch product production (easy cleaning, corrosive chemicals).	Pharmaceuticals, fine chemicals, and reactive metals.	Reactors, piping, storage tanks, and vessels.
Product purity .....	Pharmaceuticals and fine chemicals.	Reactors, piping, storage tanks, and vessels.
Anti-stick .....	Plastic materials PVC, latex.	Storage tanks, and vessels, blenders and mixers, polymerizers.

The industrial inorganic chemicals industry (SIC 2819) consumes an average of 21 percent of the dollar-value of annual shipments in glass-lined equipment. The medicinal chemicals and botanical products industry (SIC 2833) consumes 20 percent of the dollar value, and the plastic materials and synthetic resins industry (SIC 2821) consumes 15 percent. Of the other end-user industries, each accounts for 10 percent or less of the market.

#### 5. Industry Sales Patterns 1975-1980.

*a. U.S. Shipments.* U.S. shipments<sup>9</sup> of glass-lined chemical processing equipment totalled \* \* \* million in 1980 in current dollars. In 1975 dollars, this equals \* \* \* million, a \* \* \* from the 1976 \* \* \* from the 1978 \* \* \* (all figures in 1975 dollars).<sup>10</sup> Imports as a percent of U.S. consumption \* \* \*.

Reactors,<sup>11</sup> conical dryer blenders, heat exchangers and reactor drives bring in the bulk of glass-lined chemical processing equipment revenues. Of the four products, reactors represent the greatest number of units sold and the largest share of this market segment's revenues. Between 1975 and 1980 shipments of the four items consistently approached or surpassed \* \* \* percent of U.S. glass-lined chemical processing equipment sales.

As a group, glass-lined pipe sections, fittings and valves are the second greatest money producers for the industry. In 1975, this equipment represented \* \* \* percent of U.S. sales;

<sup>9</sup> U.S. Shipments refers to revenues received from sales of new equipment and reglassing of existing equipment; export revenues are excluded.

<sup>10</sup> Dollars were adjusted according to the Bureau of Labor Statistics Chemical Industry Machinery Index (1975=100).

<sup>11</sup> A reactor is a cylindrical vessel or tank which may contain agitators, coils, heat exchangers, or other parts used to aid in the mixing, agitating and blending of products. Entry is gained via a hatch or manhole. Various attached pipes and valves allow products to enter and/or exit the tank.

in 1980 it accounted for \* \* \* percent. \* \* \*

Storage tanks are third in sales. Between 1975-1980 they accounted for \* \* \* percent of sales in the U.S.

\* \* \* \* \*

*b. Exports.* Since 1975, \* \* \* has exported from the U.S. an average of \* \* \* million in glass-lined chemical processing equipment annually (\* \* \*). \* \* \*. The exports of other firms are negligible.

*c. Imports.* \* \* \* percent of the glass-lined equipment sold in the U.S. is imported. \* \* \*

\* \* \* \* \*

*d. U.S. Tariff Treatment.* In 1980, \* \* \* million worth of glass-lined equipment was imported into the U.S., representing \* \* \* percent of U.S. shipments. \* \* \*. Tariff reductions on glass-lined equipment have been phased in since 1979. Between 1979 and 1987 ad valorem tariffs are to be reduced 60 percent on storage tanks exceeding 75 gallons and 46 percent on reactors, the two items producing the bulk of the government's tariff revenues from glass-lined equipment. In 1979 ad valorem tariffs on large tanks and reactors were 6.5 percent and 6.0 percent, respectively. In 1982 the tariffs are 5.0 percent and 5.3 percent. By 1987 the tariffs will be 2.6 percent and 4.2 percent. Additional equipment as well as the powder used to make glass linings now carry tariffs of 6 percent-10.5 percent. Tariff reductions are also being phased-in for most of these products.

\* \* \* \* \*

**6. Employment.** The Department of Labor reports that production of glass-lined chemical processing equipment requires the following critically skilled personnel: glass formulators, master smelters, tank sprayers, ceramic engineers, hot dusters, and furnace operators. Of these critical labor categories \* training time extends from one to three years for smelters, sprayers, dusters and furnace operators, and from five to twenty years for engineers and glass formulators. These training times are required for employees to reach optimum performance levels if they are initially unfamiliar with the jobs and associated skills. (The formulation of glass enamel or frit is a science and an "art"; hence there is a lengthy training

period for those developing frit formulae.)

The glass-lined chemical processing equipment industry has \* \* \* the size of its labor force over the past few years. The Department of Labor reports that in 1978 approximately \* \* \* people were employed, whereas an average of \* \* \* were working in the January-June 1981 period: a \* \* \*. \* \* \* can be seen in the skilled labor force.

The three firms report that between 1978 and mid-1981 the number of workers \* \* \*.

The \* \* \* of the skilled labor force becomes even more apparent when comparing the 1975 level to that of 1981. In 1975, \* \* \* skilled workers were employed by the industry, \* \* \* percent more than in June 1981. (\* \* \*). \* \* \*.

Three of the four labor markets where glass-lined chemical processing equipment facilities are located had unemployment rates higher than the national average in 1980.

Union, New Jersey, where DeDietrich USA has its glassing facility, had the highest unemployment rate: 13.3 percent, 6.2 percent age points above the national average. Elyria, Ohio, the site of one of Pfaudler's two plants, had the second highest unemployment rate: 13 percent. Finally, Newport, Kentucky, the home of Ceramic Coating's facility had an 8.1 percent unemployment rate. Rochester, New York where Pfaudler produces \* \* \*, had a lower-than-average unemployment rate.

The Department of Labor notes that the loss of jobs carries with it the possible loss of skills. The glass-lined chemical processing industry has an average hourly wage of \* \* \*. This is less than the hourly wage of \* \* \* paid in the broader industry.\*\* Wage scale differences may encourage laid-off workers to take available jobs where the pay is more attractive. The glass-lined chemical processing equipment industry will therefore be unable to rehire those workers. Consequently, the industry may suffer a loss of necessary skills.

As discussed in the "Capacity and Utilization" section of this paper, additional employees are needed if the industry is to meet emergency production capacity. Should an emergency arise, training will be needed for rehired workers who have lost some proficiency as well as for new workers who have little, if any familiarity with glass-lined chemical processing equipment.

The industry will be fortunate if it can enlist the services of workers in related

industries during an emergency. The glass-lined chemical processing equipment industry will compete with other industries for workers able to assist in emergency-related production.

Various factors have contributed to the loss of jobs in this industry and the possible loss of skills. Among these factors are: the recession; the imports, which make up about \* \* \* percent of the glass-lined chemical processing equipment sales; and the recent 30 percent deterioration of the French franc in relation to the dollar, which makes foreign production attractive to \* \* \*. Increased productivity in the domestic industry has also had an impact on employment. \* \* \*.

**7. Competition From Substitute Materials.** There are many substitutes for glass-lined chemical processing equipment, but few offer the corrosion resistance to as broad a spectrum of acids and alkalis as glass. Some substitutes cost less than glass-linings, others more. Prominent among the substitutes are: polymeric materials; tantalum; titanium; zirconium; hastelloys; inconels and stainless steels.

Polymeric materials (including Teflon and Kynar) are cheaper than glass-linings, but have lower temperature limits; permeability problems also afflict the polymeric. Tantalum is second to glass-lining in the breadth of its corrosion resistance. Tantalum, however, is more expensive than glass, its availability is poor, and it generally has a shorter lifespan than glass. Titanium, zirconium, and the hastelloys rank beneath tantalum because their use is restricted to a narrower range of chemicals. Depending on cladding thickness, their costs are typically comparable to glass. Next considered are the inconels and stainless steels. Their costs are generally preferable to the glass-lined, but the materials are extremely limited in use.

Industries employing dedicated rather than batch production have leeway to convert from glass-lined steel to the substitute materials. Industries processing less corrosive chemicals, moreover, frequently opt for the other materials in lieu of glass-lined steel. The polymer industry is one such example.

**8. Capacity and Utilization.** \* \* \*. The U.S. glass-lined chemical production equipment industry as a whole reports it is operating at about \* \* \* emergency production capacity.<sup>12</sup>

<sup>12</sup>This estimate is based on responses to the Department's survey of the industry. The Department has defined "emergency production capacity" as: a measurement of equipment capability based on the assumptions and conditions that: (1) equipment is operated on a work schedule

\*The Employment and Training Administration at the Department of Labor considers an occupation critical if: 1) it is unique and has no precise counterpart in American industry; and, 2) it is essential to maintain production; and 3) it would take a minimum of one year's orientation or training before a worker could adequately perform the duties and responsibilities of the specific position.

\*\*SIC 3443, Fabricated Plate Works (Boiler Shops).



In the event of a national emergency, it may be assumed that demand for reactors and tanks will exceed that for other glass-lined chemical processing equipment; such has been the peacetime norm. Pfaudler, DeDietrich and Ceramic Coating companies' respective emergency production capacities for reactors are \* \* \* of the industry's total domestic capability; the emergency production capacities for tanks are: \* \* \* respectively (\* \* \*). They report that meeting these production capacities would require an expanded work force.

This level of production is sufficient to meet mobilization requirements.

Pfautler estimates that an additional \* \* \* critically skilled employees are needed to meet emergency production capacity for all equipment. DeDietrich states that another \* \* \* skilled workers would have to man its glassing operation to increase its emergency output by \* \* \* percent. Ceramic Coating did not respond to this question.

If future demand exceeds present estimates and emergency production capacities, additional facilities would be necessary to provide a larger production base (the lead time for erecting a new facility is at least 12 months).

The Federal Emergency Management Agency (FEMA) has determined that production capacity for glass-lined chemical processing equipment need not expand during a period of mobilization. End-users of glass-lined equipment have ample capacity to meet mobilization requirements.

### III. Findings

#### A. Vulnerability of the Industry

In reviewing the vulnerability of this industry to imports, factors dealing with cost of materials, availability of skilled labor, growth trends, efficiency and alternative equipment trends were studied. Weaknesses were found in several of these factors; however, sufficient U.S. industry capacity exists to meet national emergency demands.

Direct and indirect defense requirements as well as essential civilian needs are best served by this industry when operations are profitable.

Healthy operations in normal, non-emergency periods have been found to have direct bearing on the ability of

facilities and manpower to provide and maintain emergency period production. Normal production assures continuing availability of skilled personnel, trained management, and proper maintenance of furnaces and other equipment. In addition, this condition would help guarantee availability of coating formulations, special shapes of steel, and other supplies and materials.

The Department of Defense has a small direct peacetime, surge and mobilization requirement for glass-lined chemical processing equipment. The loss of a major domestic production would, however, impair readiness particularly if we became more dependent on foreign sources. France is an ally of the U.S. and would be unlikely to interrupt exports to the U.S. during any foreseeable crisis. However, under a full mobilization condition shipping losses are estimated to be extensive.

1. Relationship to National Security. Glass-lined chemical processing equipment is considered basic and vital to the health, welfare and thus the security of the United States. Industries which use this equipment are critical either directly or indirectly to the defense of the United States and to the general economic welfare. In many applications where glass-lined reactors, tanks, and equipment are utilized, no substitutes are normally acceptable. In other cases substitutes are expensive or are very difficult to obtain in emergency situations. For industrial processes where glass lining is not a primary requirement, other materials are making competitive inroads; ceramic-metal composite materials, plastic-coated steel, nickel alloys, tantalum or titanium are used to produce chemical reactors, mixers, heat exchangers, storage tanks or fermenters.

Many forms of glass-lined chemical processing equipment are being marketed for defense or defense related industries. The lead time from engineering design, to manufacture, to installation, may be as long as two years for major custom-designed installations or as short as a few days for the replacement of valves and pipes (which are stocked). Reactors are available in capacities up to 15,000 gallons and at pressures up to 300 psi. Storage vessels, the other large sector of the market, are available up to 24,000 gallon capacity. Also manufactured are heat exchangers, columns, towers, scrubbers, stacks, dryers, and blenders. Auxiliary equipment such as piping, valves and fittings, are produced in a wide variety of sizes.

2. Effect of Current Economic Conditions. U.S. industrial capability

and production capacity to produce glass-lined chemical processing equipment is under competitive strain as a result of imports. This could be a critical period for this industry. \* \* \*. General economic conditions play an important part in the health of all firms producing capital equipment for basic industries. Capital purchases in the chemical industry are historically cyclical and currently are in a low point on the cycle. Although the glass-lined chemical processing equipment industry may lay the blame for lost orders on imports, there is a strong indication that in the short term, at least, imports have not been completely to blame. The retrenchment of this industry is seen as the result of the slackening demand in the chemical processing industry, imports and a change in emphasis by the industry leader to concentrate on the small size equipment where it seems to have a competitive edge.

3. Limits to Production. Production to meet mobilization requirements could be limited since the essential raw materials required in the fabrication of this equipment, i.e., steel products, manganese, borax, cobalt, lithium, nickel, strontium, and the substitute materials (more expensive than glass) such as stainless steel, nickel inconel and hastelloy may be needed for higher priority products.

Production equipment such as furnaces, materials handling equipment and steel fabricating equipment could be obtained from various equipment suppliers with specialized glassing equipment and furnace building experience. In addition, numerous manufacturers exist to fabricate the steel configurations. It is the industry practice to formulate frit coating materials in-house. However, frit can be obtained from outside sources but the purchaser may have to provide his proprietary formula. Personnel may be available from near-related industries such as those producing glass-lined farm storage systems and glass-lined water heaters. Varying amounts of retraining may be needed for these workers.

Industrial and ceramic engineers are available from within member firms of the National Association of Corrosion Engineers to assist in an emergency to develop plant capacity to produce chemical processing grade glass-lined equipment.

Based on industry replies to the Department of Commerce questionnaire, imports were about \* \* \* percent of average demand in the U.S. from 1975 to 1980. The percents of imports for each of these years show \* \* \*. Therefore, it cannot be anticipated that imports will

to attain maximum rate of production during an emergency; (2) allowances are made for machinery downtime required for maintenance and repairs needed to sustain peak production; (3) only present building facilities, furnaces and machinery available as of December 31, 1979, or put in place since that date (including idle or standby facilities) would be allocated for production under all-out emergency conditions; and (4) availability of adequate labor force, production materials, supplies and utilities is assumed.



show a steady increase in the foreseeable future.

According to an analysis by the Federal Emergency Management Agency, since 1981, production capacity of industrial chemicals and other end users is more than sufficient for a conventional mobilization. Imports of glass-lined vessels cannot be deemed a future danger to the capability of the U.S. to mobilize for a conventional war.

4. Foreign Competition. Foreign competition in the U.S. market appears to come primarily in equipment from

\*\*\* Sybron Corporation is a diversified manufacturer of professional health products (dental chairs, x-ray equipment, and other dental, medical, and laboratory products); industrial and consumer instrumentation; process and water-waste treatment equipment, primarily glass-lined chemical processing equipment (Pfaudler division); and speciality chemicals.

Other foreign firms selling in the United States have had a \*\*\* share of the market. This includes equipment \*\*\*.

According to the trade, there are \*\*\*.

5. Financial Assistance. Ceramic Coating alleged that DeDietrich's French operations enjoyed financial advantages due to assistance received from the French government. Investigators were unable to determine that DeDietrich received special subsidies, loans, grants or export assistance, \*\*\*. However, as a French exporter, it may have benefitted from the obvious tax rebates of the value added tax system and possible dollar credits as a result of being a large exporter to the U.S.

Pfaudler may obtain benefits via Sybron. Financing arrangements as reported on the firm's Form 10-K filed with the Securities and Exchange Commission and re-stated in the 1980 Sybron Annual Report include the following: A loan guarantee from the County of Monroe Industrial Development Agency, Monroe, New York; favorable financing via the New York State Urban Development Corporation; borrowing of \$2.9 million at 3 percent per annum via an Urban Development Action Grant from the US Government to the City of Rochester; the Corporation's Chemical Division had a financing agreement with the New Jersey Economic Development Authority; and a beneficial rate loan from a U.K. company.

\*\*\*\*\*

## B. Costs of Protecting this Industry

### 1. Economic Costs. Assessing the

economic and social costs of protecting this industry, made up of only three manufacturers, it is noted that (a) imports are not essential to the national security since both domestic producers and user industries have excess capacity, (b) that imports have directly and indirectly contributed to the competitive strength of the U.S. glass-lined chemical processing equipment industry, and (c) that any alleged "weakening" of existing U.S. capability must first be attributed to general economic conditions, especially to the down side cycle of the end-user industries, not to the level of imports.

Employment in this industry has gone \*\*\* since 1975. (In 1979, \*\*\*). However, all three firms operate in geographical areas where unemployment rates are generally high: Ohio 13 percent; New Jersey 13.3 percent; and Kentucky 8.1 percent; with Rochester, New York at 6.2 percent (1980 data). Reducing imports artificially will not improve this situation. With a 15 percent increase in general overseas shipping rates in 1982 and the cost of labor and energy also going up steadily, interest rates and international exchange rates moderating, market factors will dictate improvement for this industry without government assistance. (\* \*\*).

If all U.S. needs were imported versus all U.S. production with no imports, the net effect on total U.S. revenues (tariffs vs. corporate taxes) would be very small.\* This is an extreme example to measure revenue effects, and does not take into consideration national security, economic or social costs of closing U.S. operations, nor the international trade implications of stopping all imports.

2. Foreign Policy Considerations. A decision on whether national security considerations warrant import restrictions to protect domestic manufacturers should include analysis of our broad objectives in the area of international trade and the likely effects of any import restrictions on benefits accruing to the United States from adherence to the GATT system and from good relations with the suppliers of the equipment involved.

The U.S. has long been a champion of a free international trading system, because such a system promotes the economic well being of the American people and that of our trading partners—the most important of which are also U.S. allies. The system which was developed since World War II

already provides remedies in situations where unfair practices of our trade partners adversely affect our domestic industries, and where viable industries need temporary protection to adjust to import competition.

Granting import protection to manufacturers of glass-lined chemical processing equipment on national security grounds would not in itself shake the trading system, but could well serve as a precedent for protection of a series of other products, which could have serious consequences.

Major trading countries have not generally used national security as a justification for protecting domestic producers, although that is not unheard of. Sweden restricts shoe imports on the grounds that a domestic shoe industry would be needed in time of war to outfit Swedish troops; Switzerland restricts food imports, claiming that at least a 50 percent self-sufficiency in food would be necessary in time of war.

France is a major trading partner of the U.S. with bilateral trade exceeding \$12 billion. The U.S. maintains a considerable surplus in this trade, which is a closely watched, sensitive point with the French. France is an ally of the U.S. and would be unlikely to interrupt exports to us during any foreseeable crisis.

The Reagan Administration has actively sought to improve relations with France and to remove irritants in Franco-American trade.

It has taken steps to improve the climate of U.S.-French relations generally at a time when we are seeking support from the French on difficult international issues. Import restrictions affecting French-produced products could weaken these efforts.

The French challenge to this industry, while appearing to be threatening, has been met competitively by U.S. industry in terms of productivity and quality production. The French firm offers, via its U.S. operations, imported products of quality at prices which have allowed for penetration of the domestic market.

It supplies a few domestically produced products, and provides maintenance and reglazing services directly from its plant in New Jersey and a maintenance facility in Texas. The French firm and its U.S. subsidiary view the U.S. as a growing and challenging market.

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\*Tariffs of about \*\*\* million and corporate taxes of \*\*\* to \*\*\* million.