

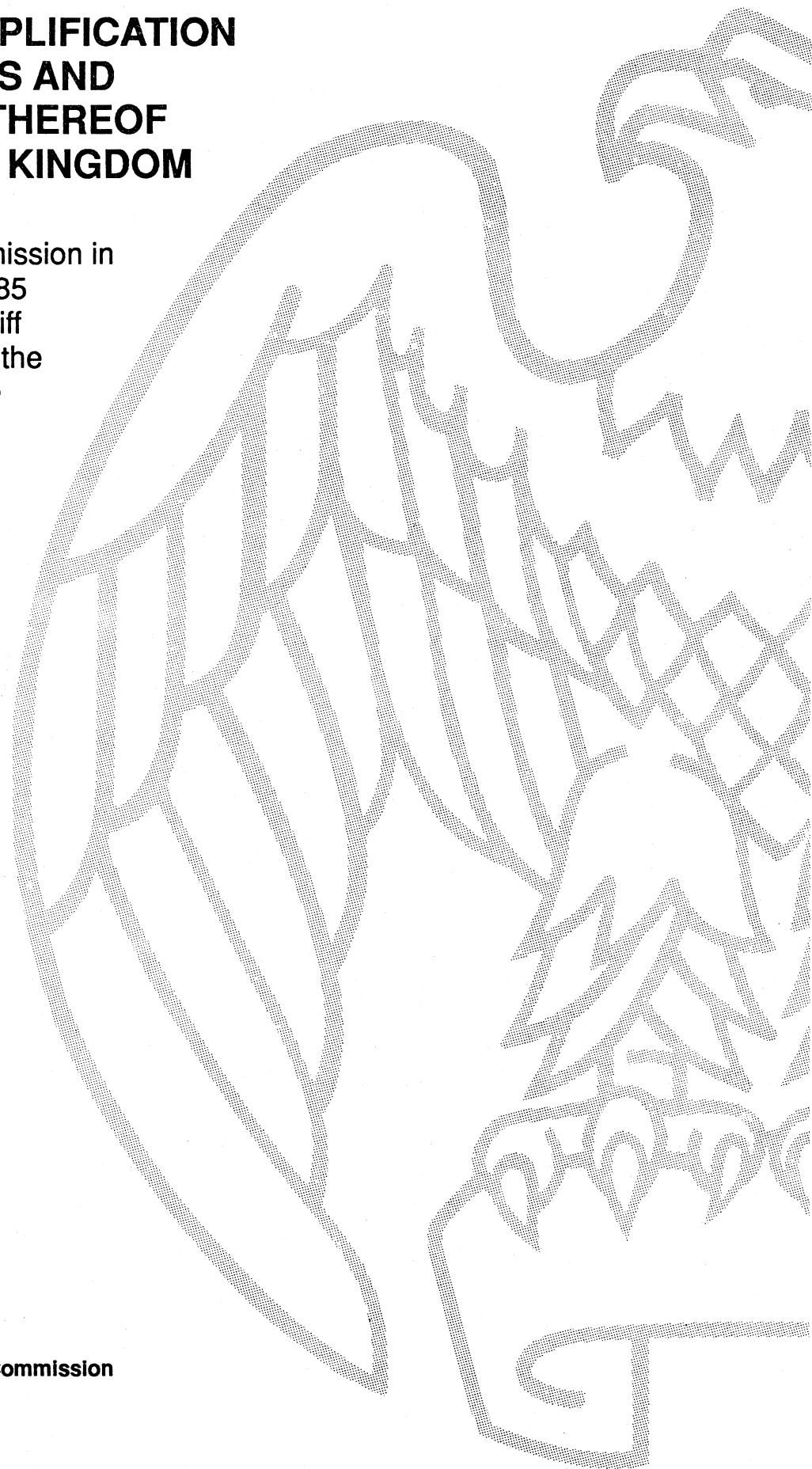
# **CERTAIN GENE AMPLIFICATION THERMAL CYCLERS AND SUBASSEMBLIES THEREOF FROM THE UNITED KINGDOM**

Determination of the Commission in  
Investigation No. 731-TA-485  
(Preliminary) Under the Tariff  
Act of 1930, Together With the  
Information Obtained in the  
Investigation

**USITC PUBLICATION 2346**

**DECEMBER 1990**

**United States International Trade Commission  
Washington, DC 20436**



**UNITED STATES INTERNATIONAL TRADE COMMISSION**

**COMMISSIONERS**

**Anne E. Brunsdale, Acting Chairman**

**Seeley G. Lodwick**

**David B. Rohr**

**Don E. Newquist**

*Staff assigned:*

**Janine Wedel, Investigator**

**William Shpiece, Economist**

**David Slingerland, Commodity-Industry Analyst**

**Chand Mehta, Accountant**

**Cynthia Johnson, Attorney**

**Steve McLaughlin, Attorney**

**George Deyman, Supervisory Investigator**

**Address all communications to  
Kenneth R. Mason, Secretary to the Commission  
United States International Trade Commission  
Washington, DC 20436**

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Note.--Information that would reveal business proprietary operations of individual concerns may not be published and therefore has been deleted from this report.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



UNITED STATES INTERNATIONAL TRADE COMMISSION

Investigation No. 731-TA-485 (Preliminary)

CERTAIN GENE AMPLIFICATION THERMAL CYCLERS AND SUBASSEMBLIES  
THEREOF FROM THE UNITED KINGDOM

Determination

On the basis of the record<sup>1</sup> developed in the subject investigation, the Commission determines,<sup>2</sup> 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 threatened with material injury by reason of imports from the United Kingdom of Peltier-effect in vitro gene amplification thermal cyclers and subassemblies thereof,<sup>3</sup> provided for in subheadings 8419.89.50 and

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

<sup>2</sup> Acting Chairman Brunsdale and Commissioner Rohr dissenting.

<sup>3</sup> The imports covered by this determination are certain gene amplification thermal cyclers (GATCs), consisting of Peltier-effect in vitro GATCs, whether assembled or unassembled, and the subassemblies thereof specified below. GATCs are microprocessor-based reaction controllers that regulate temperatures of biologic reagents through a programmed and highly-controlled thermal regime. GATCs incorporate a metal sample block, one or more thermoelectric modules, one or more electronic thermal sensors, a heat exchanger, power supply circuitry, microprocessor-based logic circuitry, software, and a housing or enclosure. GATCs are used in a variety of biotechnology applications, such as in vitro gene amplification, and sequencing and radionucleotide labeling reactions. Peltier-effect machines use one or more thermoelectric modules for cooling the biologic samples, and the thermoelectric modules and/or electric resistive heaters for heating the biologic samples. Excluded from the scope of this determination are vapor-compression thermal cyclers, which use a reversed Rankine cycle apparatus, and heat-only thermal cyclers.

The following subassemblies are included in the scope of the determination when they are manufactured according to specifications and operational requirements for use in a GATC as defined in the preceding paragraph: (a) the sample block/thermoelectric/sensor/heat exchanger subassembly, which consists of the sample block, one or more thermoelectric modules, one or more electronic thermal sensors, and a heat exchanger, and which can include an electric resistive heater; (b) the housing or enclosure, whether finished or unfinished, of the GATC; (c) the membrane keypad used to program and control a GATC; and (d) the software to operate the GATC.

8419.90.90, respectively, of the Harmonized Tariff Schedule of the United States, that are alleged to be sold in the United States at less than fair value (LTFV).

### Background

On November 14, 1990, a petition was filed with the Commission and the Department of Commerce by MJ Research, Inc., Watertown, MA, alleging that an industry in the United States is materially injured and threatened with material injury by reason of LTFV imports of Peltier-effect in vitro gene amplification thermal cyclers and subassemblies thereof from the United Kingdom. Accordingly, effective November 14, 1990, the Commission instituted preliminary antidumping investigation No. 731-TA-485 (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 November 20, 1990 (55 F.R. 48302). The conference was held in Washington, DC, on December 5, 1990, and all persons who requested the opportunity were permitted to appear in person or by counsel.



## VIEWS OF THE COMMISSION

Based on the information obtained in this preliminary investigation,<sup>1</sup> 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 Peltier-effect in vitro gene amplification thermal cyclers from the United Kingdom.<sup>2</sup>

The legal standard in preliminary antidumping investigations is set forth in section 733(a) of the Tariff Act of 1930, 19 U.S.C. 1673b(a), which requires the Commission to determine, based on the best information available at the time of the preliminary determination, whether there is a reasonable indication of material injury to a domestic industry, or threat thereof, by reason of imports alleged to be sold at LTFV.

Further, in American Lamb v. United States, 785 F. 2d 994 (Fed. Cir. 1986), the Federal Circuit held that the Commission may weigh the evidence in determining whether "(1) the record as a whole contains clear and convincing evidence that there is no material injury, threat of material injury, and (2) no likelihood exists that contrary evidence will arise in a final investigation."<sup>3</sup>

Like Product and Domestic Industry

In this, as in other Title VII investigations, the Commission must first

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<sup>1</sup> Because of the limited number of producers and importers in this investigation, much of the data on which we rely for our determination is business proprietary, and our discussion of data is necessarily general.

<sup>2</sup> The industry, which we define below to be the domestic manufacturers of all gene amplification thermal cyclers, has been in existence since at least 1988. Based on our analysis of the data, we find that the industry is established. Therefore, material retardation is not an issue and will not be discussed further.

<sup>3</sup> 785 F. 2d at 1001-04 (Fed. Cir. 1986).

make factual determinations with respect to the "like product" and "domestic industry". The term "industry" is defined 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..."<sup>4</sup> Section 771(10) of the Tariff Act of 1930 defines the "like product" 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..."<sup>5</sup> The Commerce Department has determined that the products subject to investigation are:

[C]ertain gene amplification thermal cyclers, consisting of Peltier-effect in vitro GATCs, whether assembled or unassembled, and the subassemblies thereof specified below. GATCs are microprocessor-based reaction controllers that regulate temperature of biologic reagents through a programmed and highly controlled thermal regime. GATCs incorporate a metal sample block, one or more thermoelectric modules, one or more electronic thermal sensors, a heat exchanger, power supply circuitry, microprocessor-based logic circuitry, software, and a housing or enclosure. GATCs are used in a variety of biotechnology applications, such as in vitro gene amplification, and sequencing and radionucleotide labeling reactions. Peltier-effect machines use one or more thermoelectric modules for cooling the biologic samples, and the thermoelectric modules and/or electric resistive heaters for heating the biologic samples. Excluded from this investigation are vapor compression thermal cyclers, which use a reversed Rankine cycle apparatus, and heat-only thermal cyclers.<sup>6</sup>

Four types of subassemblies are also encompassed within the scope of the investigation, when they are manufactured according to specifications and operational requirements for use in a Peltier-effect gene amplification thermal cycler:

- (1) The sample block/thermoelectric module/sensor/heat exchanger subassembly, which consists of the sample block, one or more thermoelectric modules, one or more

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<sup>4</sup> 19 U.S.C. 1677(4)(a).

<sup>5</sup> 19 U.S.C. 1677(10).

<sup>6</sup> 55 Fed. Reg. 51307 (December 13, 1990).

electronic thermal sensors, and a heat exchanger, and which can include an electric resistive heater;  
 (2) the housing or enclosure, whether finished or unfinished;  
 (3) the membrane keypad used to program and control a gene amplification thermal cycler; and  
 (4) the software to operate the gene amplification thermal cycler.<sup>7</sup>

The Commission's decision regarding like product is essentially a factual determination, made on a case-by-case basis.<sup>8</sup> The Commission usually considers a number of factors when determining what product is "like" the product subject to investigation, including: (1) physical characteristics and uses, (2) interchangeability, (3) channels of distribution, (4) common manufacturing facilities and production employees, (5) customer or producer perceptions, and (6) price.<sup>9</sup> The Commission looks for clear dividing lines between like products<sup>10</sup> because minor distinctions are an insufficient basis for finding separate like products.<sup>11</sup>

In vitro gene amplification is a biochemical technique which allows scientists to amplify minute fragments of impure DNA more than a millionfold in a few hours through an automated procedure. The technique involves taking a sample of DNA, either fragmented or intact, combining the sample with specific biologic reagents, then cycling the resulting mixture repetitively

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<sup>7</sup> Id.

<sup>8</sup> Asociacion Columbiana de Exportadores de Flores v. United States, 12 CIT \_\_, 693 F. Supp. 1165, 1169 (1988) (hereinafter "ASOCOLFLORES")

<sup>9</sup> See, e.g., Polychloroprene from France and the Federal Republic of Germany, Inv. No. 731-TA-446-447 (Preliminary) USITC Pub. 2233 (November 1989) at 3, ASOCOLFLORES, 693 F. Supp. at 1170, n. 8.

<sup>10</sup> See, e.g., Polychloroprene from France and the Federal Republic of Germany, 731-TA-446-447 (Preliminary), USITC Pub. 2233 at 3, (November 1989).

<sup>11</sup> Asocolflores, 693 F. Supp. at 1168-69. S. Rep. No. 249, 96th Cong., 1st Sess., 90-91 (1979).

through a highly specific thermal regime. This thermal regime is generally carried out in specific types of equipment, referred to as gene amplification thermal cyclers (GATCs).

Three different types of GATCs have been developed: Peltier-effect, heat-only and vapor-compression types. These cyclers differ primarily in the type of heating and cooling associated with the unit.

Peltier-effect GATCs use one or more Peltier-effect heat pumps, which are solid state electronic modules for heating or cooling. Some Peltier-effect GATCs have electric resistive heaters.<sup>12</sup>

Vapor-compression GATCs use a mechanical heat pump in order to cool the sample and achieve heating of the sample through the use of electric resistive heaters. These heaters are attached to the sample block for heating. The cycler uses a circulating cooling fluid that passes through the channels in the sample block itself for cooling. The coolant is chilled by a vapor-compression apparatus moving a refrigerant through a thermodynamic cycle; an expansion valve releases the high pressure refrigerant into an expander.<sup>13</sup>

Heat-only GATCs use electric resistive heaters to heat a sample block. Cooling is achieved by passing ambient air or tapwater over a heat exchanger attached to the block, bath or vessel. Unlike the Peltier-effect and the vapor-compression GATCs, the heat-only type cannot actively pump heat, nor is it capable of attaining refrigeration temperatures, unless an external water source or chiller is added.<sup>14</sup>

In this preliminary investigation, we considered two questions relating

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<sup>12</sup> Report at A-3-4.

<sup>13</sup> Report at A-6.

<sup>14</sup> Report at A-6.

to the definition of the like product: (1) whether the like product should include all gene amplification thermal cyclers; and (2) whether subassemblies should be included in the same like product definition.

Petitioner asserted that the like product should include only Peltier-effect gene amplification thermal cyclers. Petitioner argues that the three types of thermal cyclers are: (1) technologically distinct; (2) have different uses; (3) are clearly not fully interchangeable in the marketplace; (4) differ in price.<sup>15</sup>

Respondent has argued that the like product should include all types of thermal cyclers. Respondent contends that: (1) all thermal cyclers share the same essential physical characteristics; (2) all thermal cyclers share the same end use; (3) virtually all thermal cyclers are interchangeable for the automated processing of biological samples; (4) all thermal cyclers are sold through the same channels of distribution; (5) the production processes are similar; (6) all thermal cyclers compete in the same market and offer the necessary specifications for broadly applied uses; and (7) the prices among thermal cyclers of different technologies are relatively competitive within a reasonably narrow range.

Neither party has argued that the subassemblies should constitute separate like products.

Whether the Like Product Should Include all Gene  
Amplification Thermal Cyclers

In regard to the general characteristics and uses of these products, all three types of gene amplification thermal cyclers marketed are microprocessor-based reaction controllers that regulate temperatures for small quantities of

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<sup>15</sup> Petitioner's Post-conference brief at 2-3.

biologic reagents through a programmed and highly controlled thermal regime. All three types are used in biotechnology applications, including a biological protocol called in vitro gene amplification, as well as in several related sequencing and radionucleotide labeling reactions.<sup>16</sup> The machines differ in their end use applications only in that heat-only machines cannot perform at below ambient temperatures and cannot refrigerate biological samples following the completion of a gene amplification process, without outside cooling sources.

The area in which the different types of thermal cyclers differ most is in their method of production. Peltier-effect machine manufacturing steps consist of assembling the four main subassemblies: the logic circuit board, the power circuit board, the sheet metal housing with keypad, and the thermoelectric "alpha unit." The process of manufacturing vapor-compression GATCs is somewhat different, inasmuch as the unit consists largely of mechanical subassemblies. The manufacture of these mechanical components is greatly different from the manufacture of electronic subassemblies, and involves more extensive capital equipment. The production process therefore is more capital intensive and involves a somewhat different set of skills and equipment than those employed in the production of Peltier-effect cyclers.<sup>17</sup> Because of the differences in components, many of the subassemblies used in vapor-compression cyclers would not be interchangeable with those used in Peltier-effect cyclers. However, for most applications, the thermal cyclers appear to be interchangeable to the end user.<sup>18</sup>

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<sup>16</sup> Report at A-2.

<sup>17</sup> Report at A-8.

<sup>18</sup> Report at A-25.

Vapor-compression GATCs are more expensive than Peltier-effect GATCs, and Peltier-effect GATCs are generally more expensive than heat-only GATCs. These different price structures may be related to market perception of each type of GATC, as well as to either the production cost or particular features of each firm's machine.<sup>19</sup> With respect to channels of distribution, all types of GATCs are sold through a distributor network and/or directly to end-users.<sup>20</sup>

For the purpose of this preliminary investigation, we find the like product to be all types of gene amplification thermal cyclers. The different types of thermal cyclers differ in the inner workings of the heating and cooling system. While this difference does have an effect on manufacturing processes, price and (to a limited extent) use, as noted, the different types of thermal cyclers are generally used for essentially the same purpose and are interchangeable by the end user. However, we shall revisit this like product issue in any final investigation.

Whether the subassemblies of Gene Amplification Thermal Cyclers within the scope of the investigation constitute a separate like product

Commerce's scope determination includes four specified components of gene amplification thermal cyclers "when they are manufactured according to specifications and operational requirements for use in a GATC." The Commission thus must determine whether domestically produced components of GATCs like those within the scope of the investigation constitute a separate

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<sup>19</sup> Report at A-26.

<sup>20</sup> Report at A-12.

like product or products.<sup>21</sup>

In prior investigations, the Commission has examined whether components of "semi-finished" products should be included in the same like product as finished products. In such an analysis, the Commission has reviewed: (1) the necessity for, and costs of, further processing; (2) the degree of interchangeability of articles at different stages of production; (3) whether the article at an earlier stage of production is dedicated to use in the finished article; (4) whether there are significant independent uses or markets for the finished and unfinished articles; and (5) whether the article at an earlier stage of production embodies or imparts to the finished article an essential characteristic or function.<sup>22</sup>

Reviewing the factors that the Commission usually considers in addressing parts and components issues, we note that the components under investigation need further processing before they can be used for gene amplification. The process of assembling a GATC from its various components involves intricate technical work.<sup>23</sup> The components are not interchangeable at different stages of production.

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<sup>21</sup> Neither party has argued that the subassemblies should constitute a separate like product. However, this does not preclude the Commission from considering the issue.

<sup>22</sup> E.g., Certain Laser Light-Scattering Instruments and Parts Thereof from Japan, Inv. No. 731-TA-455 (Final), USITC Pub. 2238 at 10-11 (November 1990); Certain Residential Door Locks and Parts Thereof from Taiwan, Inv. No. 731-TA-433 (Final), USITC Pub. 2253 at 8 & n.16 (January 1990); Certain Telephone Systems and Subassemblies Thereof from Japan and Taiwan, Inv. Nos. 731-TA-426 and 428 (Final), USITC Pub. 2237 at 5, n.9 (November 1989); 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, Inv. Nos. 303-TA-19-20 and 731-TA-391-399 (Preliminary), USITC Pub. 2083 at 20-22 (May 1988).

<sup>23</sup> Report at A-6.



The subassemblies at issue are those corresponding to the included subassemblies "for use only in GATCs", and thus, dedicated for use in the final product. The manufacturing process confirms this dedication. For example, MJ Research assembles the product and some of the subassemblies at issue in house.<sup>24</sup> Outside companies are commissioned to produce the metal housing and membrane key pad. However, the components are specifically designed in house for the GATC.<sup>25</sup> Moreover, there are no known significant independent markets for the subassemblies at issue.

The record indicates that the individual components at issue impart essential characteristics to a GATC. For example, the "alpha" unit is necessary to provide heating and cooling means; the membrane keyboard is necessary to operate the machine; and the software is essential to automate the machine.

The Commission has in previous investigations concluded that components dedicated to use in a finished product and essential to the product's operation should be included in the same like product as the finished product, notwithstanding that the components are not interchangeable with the finished product, especially if they incorporate essential characteristics.<sup>26</sup> In this

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<sup>24</sup> Transcript at 84-85.

<sup>25</sup> Id.

<sup>26</sup> See High Information Flat Panel Displays and Subassemblies thereof from Japan, Inv. No 731-TA-469 (Preliminary), USITC Pub. 2311 at 10-13 (September 1990); Certain Residential Door Locks and Parts Thereof from Taiwan, Inv. No. 731-TA-433 (Final), USITC Pub. 2253 at 8-10 (January 1990); Certain Telephone Systems and Subassemblies Thereof from Japan, Korea, and Taiwan, Inv. No. 731-TA-426-428 (Preliminary), USITC Pub. 2156 at 13-15 (February 1989). In these investigations, the Commission noted that it has place greater emphasis on essential characteristics and interchangeability factors when considering semifinished products that merely go through additional processing stages than when considering groups of components that must be combined to form the finished product. When a finished product is comprised of many components, none of which

investigation, where a single, integrated production process encompasses both the production of subassemblies and production of the finished instrument, we find that the like product in this investigation includes both the finished GATC and dedicated subassemblies thereof.<sup>27</sup>

Based on the foregoing, we determine that there is one like product, composed of all gene amplification thermal cyclers and subassemblies thereof. We further determine that there is one domestic industry, consisting of the domestic producers of gene amplification thermal cyclers and subassemblies thereof.

#### Condition of the Industry

In assessing the condition of the industry, we consider, among other factors, production, shipments, capacity, capacity utilization, inventories, employment, wages, financial performance, capital investments and research and development expenditures.

Domestic production, shipments and capacity have risen steadily throughout the period of investigation. Capacity utilization decreased throughout the period of investigation, due primarily to an unused expansion of capacity. Trends in the number of production and related workers paralleled the upward trends in production and shipments of GATCs.<sup>28</sup> However, hourly wages and hourly total compensation declined from 1988 to 1989.

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contain the essential characteristics of the finished product, the Commission has found the factors of essential characteristics and absolute interchangeability to be less significant.

<sup>27</sup> We intend to gather data in the final investigation to further explore the subassemblies for all gene amplification thermal cyclers.

<sup>28</sup> Report at A-15.

Capital expenditures increased throughout the period of investigation.<sup>29</sup>

Research and development increased throughout the period of investigation.<sup>30</sup>

It is difficult to characterize the financial performance of the domestic industry, inasmuch as the Commission was unable to gather financial data from one of the largest domestic producers of thermal cyclers. However, based on the available data, we find no reasonable indication that the domestic industry is suffering present material injury, but we find that there is a reasonable indication that there is a threat of material injury to the domestic industry.

Reasonable Indication of Threat of Material Injury

We have made our affirmative determination on the basis of a reasonable indication of threat of material injury rather than material injury, because the available data do not indicate that the domestic industry is suffering present injury.

Section 771(7)(F) of the Tariff Act of 1930 directs the Commission to determine whether a U.S. industry is threatened with material injury by reason of imports "on the basis of evidence that the threat of material injury is real and actual injury is imminent. Such a determination may not be made on the basis of mere conjecture or supposition." <sup>31</sup> The ten factors that the Commission must consider are:

(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),

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<sup>29</sup> Report at A-19.

<sup>30</sup> Id.

<sup>31</sup> 19 U.S.C. § 1677(7)(F)(ii).

(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,

(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 probability that importation (or sale for importation) of the merchandise (whether or not it is actually being imported at the time) will be the cause of injury,

(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 1671 or 1673 of this title or to final orders under section 1671e or 1673e of this title, are also used to produce the merchandise under investigation,

(IX) in any investigation under this title which involves imports of both raw agricultural product (within the meaning of paragraph (4)(E)(iv) and any product processed from such raw agricultural product, the likelihood there will be increased imports, by reason of product shifting, if there is an affirmative determination by the Commission under section 705(b)(1) or 735(b)(1) with respect to either the raw agricultural product or the processed agricultural product (but not both), and

(X) the actual and potential negative effects on the existing development and production efforts of the domestic industry, including efforts to develop a derivative or more advanced version of the like product.<sup>32</sup>

In addition, the Commission must consider whether dumping findings or the issuance of antidumping remedies against the same class of merchandise in

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<sup>32</sup> 19 U.S.C. § 1677(7)(F)(i), as amended by 1988 §§ 1326(b), 1329.

foreign countries suggest a threat of material injury to the domestic industry.<sup>33</sup> We consider each statutory consideration applicable to this investigation in turn.<sup>34</sup>

Foreign production capacity increased significantly during the period of investigation.<sup>35</sup> Further, it is evident (based in part on confidential data), that imports will increase in the future.<sup>36</sup> At present, the absolute level of imports is relatively small. However, the imported product has captured a fairly significant portion of the market, particularly in view of the fact that the subject imports have only been in this market since the spring of 1990.<sup>37</sup> We believe that the speed with which the imports have penetrated the market, coupled with the increased capacity during the period of investigation in the United Kingdom, provides a reasonable indication that market penetration will increase to an injurious level.

There is also a significant number of machines in inventory in the United States.<sup>38</sup> Also significant for our analysis is the fact that repeat sales to customers are common. Therefore, any sale lost to the LTFV imports at the outset will probably compound itself into future lost sales.

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<sup>33</sup> See 19 U.S.C. § 1677(7)(F)(iii), as amended by 1988 Act § 1329.

<sup>34</sup> Because the petition does not allege a subsidy and does not concern agricultural products, statutory factors (I) and (IX) are not applicable. Because respondent produces no other products subject to antidumping or countervailing duty investigations or orders, statutory factor (VIII) is also inapplicable.

<sup>35</sup> Report at A-22.

<sup>36</sup> Id.

<sup>37</sup> We note that under Petitioner's proffered definition of the like product, the import penetration level is much more significant.

<sup>38</sup> Report at A-21.

In regard to underselling, respondent argues that domestic producers are the price leaders in this market. Indeed, there have been no repeated instances in which the respondent's product sells for less than the comparable domestic product. We note, however, that Respondent's Peltier-effect product has sold for the same price as the domestic Peltier-effect product, yet offers additional features<sup>39</sup> which, it would seem, should command a price premium. In any final investigation, we shall explore further the pricing data to determine the differences between the imported and the domestic product, and the effect of such differences on product pricing. In this regard, our assessment of available financial data suggests that the imports may have had a price suppressing effect, reasonably indicating that increasing imports will adversely affect on U.S. prices. While the available data indicate an industry in generally good condition, we note that there is confidential evidence of record which indicates that certain financial indicators worsened in interim (Jan.-Sept.) 1990 in comparison with interim 1989. Profitability decreased in interim 1990. Also, the ratio of cost of goods sold to net sales increased, suggesting that domestic producers may be vulnerable to any price suppressing effects of imports.

While research and development expenditures by the domestic industry have increased during the period of investigation, at least one domestic company believes that the threat of imported merchandise being sold at LTFV undermines their ability to fund research and development, thereby thwarting efforts to develop a more advanced product.<sup>40</sup> We intend to explore this factor further in any final investigation.

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<sup>39</sup> Report at A-28, A-4.

<sup>40</sup> Tr. at 54.

Based on the foregoing, we believe that there is a reasonable indication that the domestic industry is threatened with material injury by reason of the LTFV imports of Peltier-effect in vitro gene amplification thermal cyclers and subassemblies thereof from the United Kingdom.





**DISSENTING VIEWS OF ACTING CHAIRMAN ANNE E. BRUNSDALE****Certain Gene Amplification Thermal Cyclers  
and Subassemblies Thereof**

Investigation No. 731-TA-485 (Preliminary)

December 31, 1990

I dissent from the Commission's finding of a reasonable indication that an industry in the United States is threatened with material injury by reason of the subject imports. In particular, I find the prospect that imports will reach injurious levels in the near future to be highly speculative, especially given the circumstances in which such imports were introduced into the United States in the first place. Before reaching the question of threat, however, I treat the preliminary issues of domestic industry and standing and the question of present material injury.

**Like Product and Domestic Industry**

Gene amplification thermal cyclers (GATCs) are a new product on the biotechnology market. Every GATC performs the same core function: it puts a chemical solution containing genetic material through a programmed thermal cycle resulting in the "amplification" -- or, for the layman, the duplication -- of the genetic material. Maintaining a precise thermal cycle is critical to the outcome of the process.

GATCs on the market today contain one of three different technological configurations. The first type, called heat-only

GATCs, uses electrically resistive heating elements to heat the chemical solution. Heat-only GATCs cannot cool the compound below ambient temperature without the incorporation of a separate apparatus. A second category of GATCs incorporates electrically resistive heating elements and mechanical cooling elements. Known in the trade as vapor-compression GATCs, this technology is proprietary to the Perkin-Elmer Cetus Corp. A vapor-compression GATC can cool a solution below ambient temperature.

Petitioner MJ Research, Inc. and Coy Corp. make GATCs incorporating so-called Peltier-effect technology, which uses electronic as opposed to mechanical means for refrigerating the chemical compound. However, this category blurs with the others. While all Peltier-effect GATCs apparently use an electronic cooling apparatus, some of the Peltier-effect devices use -- as do the heat-only and vapor-compression GATCs -- electrically resistive heating elements. The significant technological difference among the three types of thermal cyclers, therefore, apparently centers on the use of a Peltier-effect refrigeration mechanism.

While the technologies incorporated into a GATC design tend to run together, other indicators suggest that the three broad categories inhabit separate market niches. Evidence on the record indicates that the presence of a refrigeration unit is an important distinguishing feature in a GATC. It reduces labor requirements by allowing an overnight experiment to be terminated automatically by cooling the compound without the intervention of

a lab technician. From the perspective of the experiment itself, the refrigeration unit allows for sharper and more precise temperature changes. According to MJ Research, the refrigeration feature distinguishes Peltier-effect and vapor-compression GATCs from heat-only units, and the former should be treated as a separate like product.

While vapor-compression and Peltier-effect GATCs are arguably more alike than either is to a heat-only model, they each have their distinguishing features. According to MJ Research, a device that includes Peltier-effect heating and cooling units has superior isothermal qualities -- that is, it keeps the temperature of the solution relatively uniform. Vapor-compression units, which rely on mechanical rather than Peltier-effect heating and cooling mechanisms, do not reach the same level of uniformity. The record is far from clear, however, on whether the same can be said for units that contain Peltier-effect refrigeration but mechanical heating elements, and on how much of a difference the isothermal quality makes in any event.

My conclusion is that, for the purposes of this investigation, Peltier-effect GATCs should be treated as a separate like product. The relevant domestic industry thus consists of the producers of those machines, MJ Research and Coy. I concede that the evidence supporting this decision is inconclusive. The most important evidence supporting this view is the fact that the three types of machines have maintained remarkably different price structures. Though the reason is

unclear, vapor-compression GATC's consistently sell for far more than Peltier-effect units. Equally true and far more understandable is the fact that heat-only units sell for less than the Peltier-effect type. However, it is difficult to rest a decision firmly on this basis because, as discussed in greater detail below, price does not seem to reflect what petitioner claims to be are significant advantages from its product.<sup>1</sup>

My decision ultimately rests on the fact that this definition of like product is the one proposed by petitioner. I am mindful of the fact that the law requires an affirmative determination if we find a "reasonable indication" of material injury.<sup>2</sup> We thus must rule in favor of the petition absent "clear and convincing evidence" that the petition must fail.<sup>3</sup> Given that apparent consumption of non-Peltier-effect GATCs in interim 1990 was over [\*\*\*] units, compared to [\*\*\*] domestically produced Peltier-effect units plus [\*\*\*] imports,<sup>4</sup> any broader definition of the like product would lower the market penetration of the subject imports to the point that, all things considered, the conclusion would be inescapable that the domestic industry is not materially injured by reason of the imported Peltier-effect

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<sup>1</sup> In fact, Perkin-Elmer's vapor-effect GATC dominates the market despite its high price even though petitioner claims its Peltier-effect design has superior scientific qualities.

<sup>2</sup> 19 U.S.C. § 1673b(a).

<sup>3</sup> American Lamb Co. v. United States, 785 F.2d 994 (Fed. Cir. 1985).

<sup>4</sup> Staff Report at A-9, Table 1, and A-14, Table 4.

GATCs. I therefore accept petitioner's definition of the like product and domestic industry as the required choice absent clear and convincing evidence that another definition is appropriate.

### Standing

The issues surrounding MJ Research's standing to bring an antidumping petition as a representative of the domestic industry are legally and factually complicated. Legally, questions are raised by the Court of International Trade's recent decision in *Suramerica de Aleaciones Laminadas, C.A. v. United States*,<sup>5</sup> in which the court held that a petitioner must have the positive support of members of the industry producing more than half of the domestic like product. That holding is now on appeal.<sup>6</sup> The factual aspects of the standing decision in the instant case are confidential, but do raise some concern about whether the petitioner has the required support of the domestic GATC industry, even as narrowly defined here to include only Peltier-effect units.<sup>7</sup>

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<sup>5</sup> Slip Op. 90-79 (Ct. of Int'l Trade August 22, 1990).

<sup>6</sup> The Commerce Department has appealed the court's holding *in toto*. The Commission joined the appeal to resolve a question left open by the court's holding, viz., whether Commerce or the Commission should make the standing determination.

<sup>7</sup> See especially Staff Report at A-11, B-10 (public version) and A-17 n.26 and B-10 (confidential version).

In the investigation underlying the *Suramerica* case, *Certain Electrical Conductor Aluminum Redraw Rod from Venezuela*,<sup>8</sup> I noted the lack of uniform support for the petition within the aluminum industry. I declined to address head-on the Commission's power to dismiss a petition on standing grounds,<sup>9</sup> but commented that "[a]n industry that perceives itself to be injured logically would rally behind a petition since such support is essentially cost-free."<sup>10</sup> I will take the same approach in this case: rather than trudge through the legal and factual mire to reach a firm conclusion on standing, I note simply that the facts relating to standing add further support to my conclusion that there is no reasonable indication that a domestic industry is materially injured or threatened with material injury by reason of the subject imports.

#### **Material Injury by Reason of Dumped Imports**

Those who follow Commission proceedings are aware that my approach to Title VII differs from that used by my current colleagues. In particular, I attempt to answer directly the question posed by the statute -- whether a domestic industry is materially injured by reason of the subject imports. To address this question, I bring to bear the basic principles of economics

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<sup>8</sup> Inv. Nos. 701-TA-287 and 731-TA-378 (Final), USITC Pub. 2103 (August 1988).

<sup>9</sup> *Id.* at 40 n.22.

<sup>10</sup> *Id.* at 41.

pertaining to how markets react to changes in the price and quantity of imports. This case, because of the relatively few actors involved and the complete record compiled during this investigation, provides a good example of the power of the economic approach to adjudicate antidumping issues.

Imports of Peltier-effect GATCs from the United Kingdom began in the spring of 1990. Importers shipped [\*\*\*] units through September 30, 1990, capturing [\*\*\*] percent of the domestic market in the first nine months of the year.<sup>11</sup> I begin with the assumption most generous to the petitioner -- namely that, absent the dumping, the domestic Peltier-effect GATC industry would have captured each of the sales that went to a United Kingdom producer. Recognizing further that increased demand for the domestic like product in the absence of dumped imports does, if anything, place upward pressure on the price of that product, then one can conclude that the lost revenues by reason of the subject imports under my preliminary assumptions would have been at least [\*\*\*] percent of current revenues and possibly higher.<sup>12</sup> Such an impact on revenues, production and prices would suggest that the domestic industry is materially

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<sup>11</sup> It is difficult to tell on this record what the market penetration was during the period in which imports were actually entering the market -- i.e., April through September. It is likely that import penetration during this period was somewhat higher than during the entire interim period.

<sup>12</sup> Lost sales, lost revenues, suppressed prices, and their cumulative effect on inventories, employment, and the like, are the key factors that the Commission must consider under the relevant statute. 19 U.S.C. § 1677(7)(B), (C).

injured despite the fact that each of these financial indicators rose remarkably over the entire life of the domestic industry.<sup>13</sup>

Stopping at this point, however, accepts without proof the assumption on which the foregoing conclusion is based -- i.e., that the domestic industry would have received each of the orders that went to the United Kingdom firms.<sup>14</sup> The record in this investigation reveals, however, that this assumption is not valid in this case. In fact, the contrary evidence is so overwhelming as to force the conclusion that any injury suffered by the domestic industry at the hands of the subject imports is immaterial.

First, it is clear that the precipitating factor in the importation of Peltier-effect GATCs from the United Kingdom was a dispute between one of the domestic producers and its distributor over responsibility for problems with the quality and delivery of that producer's units. We need not resolve that dispute, though the evidence is indisputable that the problems existed.<sup>15</sup> The fact is that the distribution relationship was terminated. Since then, the distributor has turned to the subject imports for its supply and has accounted for most if not all of the subject

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<sup>13</sup> In this particular, I differ from my colleagues in my willingness to find material injury by reason of the subject imports despite the "health" of the domestic industry.

<sup>14</sup> Some members of the Commission have typically taken the assumption as true, or assume that a coincident decline in the fortunes of the domestic industry and an increase in imports establishes the truth of the assumption.

<sup>15</sup> Staff Report at A-24-25.



imports during the period in question here. The problems with the producer's units and the break between the producer and the distributor that resulted in the introduction of the imports into the United States draw into question whether the decisions of the ultimate purchasers of imported Peltier-effect GATCs were influenced by the dumped price of the imports or simply by their ready availability.<sup>16</sup>

In economic parlance, the foregoing discussion establishes a low elasticity of substitution between the domestic like product and the subject imports. The elasticity of substitution between two products measures the extent to which a purchaser will change from one product to the other -- e.g., from the import to the domestically produced good -- as a result of a change in price. It takes into account factors such as comparability of features, quality, and terms of sale. A low elasticity of substitution strikes directly at the heart of the assumption that the domestic industry would have benefited substantially from the cessation of the dumped imports or, what amounts to the same thing, that the domestic industry is materially injured by reason of the dumped imports.

Second, the record in this case reveals that purchasers who cannot acquire Peltier-effect GATCs on adequate terms will turn

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<sup>16</sup> As discussed above, the purchasers' substitution of the dumped imports for the domestic like product and the imports' possible suppressive effect on domestic prices was the foundation for the initial assumption that the imports had a material impact on the domestic industry at all. See *supra*, page 24-25.

to units encompassing other technologies. Of [\*\*\*] purchasers that cancelled orders for petitioner's or respondent's Peltier-effect GATCs, only [\*\*\*] purchased Peltier-effect devices from another source. [\*\*\*] purchased a vapor-compression GATC and [\*\*\*] purchased a heat-only GATC.<sup>17</sup> With the domestic like product defined narrowly (as petitioner requested) to include only Peltier-effect GATCs, it is certainly not clear that, absent the dumped imports, the fortunes of the domestic industry would have improved substantially. On the contrary, in the circumstances of this case it is more likely that the absence of a supply of dumped imports would have been a boon for producers of GATCs that are not included within the domestic industry. This is particularly true because the "fair" price of the subject imports as established in the petition approaches the price of the vapor-compression unit, which is already the industry leader despite its high price.

Once again, there is an economic concept that incorporates this analysis. The elasticity of demand is defined as the decrease in the demand for a product when its price increases, or vice versa. In this particular case, the elasticity of demand is high -- i.e., demand for Peltier-effect GATCs would fall significantly as their price rose, say, because of the cessation of dumping. Indeed, as discussed above, evidence on the record indicates that, by a large margin, purchasers faced with quality and delivery problems bought models produced by companies outside

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<sup>17</sup> Staff Report at A-25 n.45.

the domestic industry. It is a safe assumption that an increase in price would have the same result.<sup>18</sup>

Moreover, in this case, the market share of the subject imports -- [\*\*\*] percent or [\*\*\*] units -- is relatively low compared to other cases that routinely come before the Commission. As revealed by the facts and analysis above, the domestic industry producing Peltier-effect GATCs actually lost a much smaller fraction of those sales than the market penetration figure would suggest. On this record, I conclude that there is clear and convincing evidence that the domestic industry is not materially injured by reason of the subject imports.

#### **Threat of Material Injury by Reason of the Subject Imports**

I have examined all of the factors set forth by statute for evaluating the threat of material injury by reason of the subject imports. The evidence on the record contains nothing to suggest a surge of imports in the next year. In fact, the evidence suggests at most that the imports will remain steady and, indeed, may decline.

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<sup>18</sup> One can contrast this case with those in which I have reached the contrary result. For example, in Certain Light-Walled Rectangular Pipes and Tubes from Taiwan, Inv. No. 731-TA-410 (Final), USITC Pub. 2169 (March 1990) (Views of Acting Chairman Brundsdale and Commissioner Cass) at 10-31 (Acting Chairman Brundsdale's Views on Causation), I looked at factors similar to those considered here and concluded that the elasticity of substitution was high (rather than low) and the elasticity of demand was low (rather than high). The assumption that the considerable volume of sales of the dumped imports would have gone to the domestic industry -- i.e., that the domestic industry was materially injured by the subject imports -- was thus valid in that case.

It is true that the production of Peltier-effect GATCs is not a capital-intensive undertaking and that foreign manufacturers could increase production and exports to the United States at any time. However, there is not even a mite of evidence to indicate that such an eventuality meets the statutory requirement that a threat be "real" and "imminent."<sup>19</sup> As the matter stands now, the prospect of a threat is baseless speculation, and this inquiry must result in a negative determination.<sup>20</sup>

### Conclusion

For the foregoing reasons, I conclude that there is no reasonable indication that the domestic industry producing Peltier-effect GATCs is either materially injured or threatened with material injury by reason of the subject imports.

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<sup>19</sup> 19 U.S.C. § 1677(7)(F)(ii).

<sup>20</sup> *Alberta Gas Chemical, Inc. v. United States*, 515 F. Supp. 780, 791 (Ct. of Int'l Trade 1981) ("a mere possibility that injury might occur at some remote future time" is insufficient to establish a threat) (emphasis in original).

DISSENTING VIEWS OF COMMISSIONER DAVID B. ROHR  
CONCERNING  
CERTAIN GENE AMPLIFICATION THERMAL CYCLERS AND SUBASSEMBLIES  
THEREOF FROM THE UNITED KINGDOM  
Inv. No. 731-TA-485 (Preliminary)

I determine that there is no reasonable indication that the domestic industry is materially injured, that such an industry is threatened with material injury or that the establishment of a domestic industry is materially retarded by reason of alleged sales of Peltier-effect gene amplification thermal cyclers (GATC's) from the United Kingdom alleged to be sold at less than fair value (LTFV).

I note that the condition of the domestic industry provides no indication of material injury or material retardation. Neither the volume nor the pricing of the alleged LTFV imports are sufficient to be a cause of material injury or material retardation. Finally, reasonable projections of future volumes of imports and their prices provide no indication that imports are likely to be a cause of material injury to this rapidly expanding industry within a reasonably imminent time frame.

**Like Product**

In order to make my determination, I first define the "like product" and the "domestic industry." Section 771(4)(A) of the Tariff Act of 1930 defines the domestic industry relevant to this investigation to be the "domestic producers as a whole of a like product, or those producers whose collective output of like product constitutes a major proportion of the total domestic production of that product."<sup>1</sup> "Like product" is defined as a "product that is like, or in the absence of like, most similar in characteristics and uses with the article subject to investigation."<sup>2</sup>

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<sup>1</sup> 19 U.S.C. § 1677(4)(A).

<sup>2</sup> 19 U.S.C. § 1677(10). The Commission's decision regarding the appropriate like product(s) in an investigation is essentially a factual determination, applied on a case-by-case basis. In analyzing like product issues, the Commission has considered a number of factors

The articles subject to this investigation are certain types of GATC's and subassemblies thereof imported from the United Kingdom. In its notice of initiation, Commerce defined the scope of the investigation as:

[C]ertain gene amplification thermal cyclers, consisting of Peltier-effect in vitro GATCs, whether assembled or unassembled, and the subassemblies thereof specified below. GATCs are microprocessor-based reaction controllers that regulate temperature of biologic reagents through a programmed and highly controlled thermal regime. GATCs incorporate a metal sample block, one or more thermoelectric modules, one or more electronic thermal sensors, a heat exchanger, power supply circuitry, microprocessor-based logic circuitry, software, and a housing or enclosure. GATCs are used in a variety of biotechnology applications, such as in vitro gene amplification, and sequencing and radionucleotide labeling reactions. Peltier-effect machines use one or more thermoelectric modules for cooling the biologic samples, and the thermoelectric modules and/or electric resistive heaters for heating the biologic samples. Excluded from this investigation are vapor compression thermal cyclers, which use a reversed Rankine cycle apparatus, and heat-only thermal cyclers.<sup>3</sup>

Commerce's determination relates only to what merchandise is within the class of merchandise allegedly sold at LTFV. The Commission's determination relates to what domestic products

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including (1) physical characteristics, (2) interchangeability, (3) channels of distribution, (4) customer or producer perceptions, (5) common manufacturing facilities and production employees, (6) end uses, (7) production processes and, (8), where appropriate, price. No single factor is necessarily dispositive, and we may consider any other factors we deems relevant in a particular investigation. I do not believe it appropriate to draw distinctions based on minor variations between products. I seek "clear dividing lines among possible like products."

The Court of International Trade ("CIT") has affirmed my authority to find several domestic industries producing different like products corresponding to a single class or kind of imported merchandise. I also note that on several occasions the Commission has defined a like product to be broader than the scope of the investigation.

<sup>3</sup> 55 Fed. Reg. 51307 (December 13, 1990). Four types of subassemblies are also encompassed within the scope of the investigation, when they are manufactured according to specifications and operational requirements for use in a Peltier-effect gene amplification thermal cycler:

- (1) The sample block/thermoelectric module/sensor/heat exchanger subassembly, which consists of the sample block, one or more thermoelectric modules, one or more electronic thermal sensors, and a heat exchanger, and which can include an electric resistive heater;
- (2) the housing or enclosure, whether finished or unfinished;
- (3) the membrane keypad used to program and control a gene amplification thermal cycler; and
- (4) the software to operate the gene amplification thermal cycler.

are "like" the ones in the class defined by Commerce.<sup>4</sup>

The information obtained during the Commission's investigation reveals that there are several different types of GATC's on the market in the United States. The basic purpose of a GATC is cyclically to raise and lower the temperature of biologic samples so that certain reactions can take place at the appropriate temperatures. When using the appropriate reagents, at a relatively low temperature even a partial strand of deoxyribonucleic acid (DNA) material can replicate itself. At a higher temperature, the double helical strand will separate, and when again the temperature is lowered, each single strand will again replicate. All GATC's are designed to repeat the thermal regimen necessary for these reactions.

The different types of GATC's can be distinguished by the different methods and technologies by which they raise and/or lower the temperature of the biologic sample containing the DNA. By far the most common method of heating the sample block in a GATC is the use of an electrical resistance heater. Cooling, however is accomplished in several ways. In a "heat-only" GATC, there is no active cooling device, but rather the sample is cooled passively, by meaning of flowing air or cool or cold water over or around the sample. In a "vapor-compression" GATC, cooling is accomplished by means of a technology similar in principle to that of a refrigerator or air conditioner. Finally, a third method of cooling employs the "Peltier effect," utilizing a thermoelectric module. While in the past the Peltier effect has been used principally for cooling purposes, it can also be used, by reversing the electrical current, for heating the module.

From the record, it is clear that there are advantages and disadvantages to all of these different types of machines, including convenience, cost, reliability, and performance. All of the different types of GATC's, however, can be operated within comparable parameters from around 0°C to around 100°C, within which temperature range most of the essential reactions

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<sup>4</sup> Algoma Steel Corp., Ltd v. U.S., 688 F. Supp. 639 (June 8, 1988), aff'd, 865 F. 2d 240 (Fed. Cir. 1989).

for which GATC's are used occur.<sup>5</sup>

Focusing on the general characteristics and uses of the three types of GATC's, the record indicates that all three are microprocessor-based reaction controllers that regulate temperatures for small quantities of biologic reagents through a programmed and highly controlled thermal regime. All three types are used in biotechnology applications, including a biological protocol called in vitro gene amplification, as well as in several related sequencing and radionucleotide labeling reactions.<sup>6</sup> The machines differ in end use application only in that heat-only machines cannot perform below-ambient reactions<sup>7</sup> and cannot refrigerate biological samples following the completion of a gene amplification process, without outside cooling sources. This limitation compromises their use by laboratories that run overnight reactions. The range of uses for which all three types of GATC's can be used is much larger than those uses for which only a particular type can be used.<sup>8</sup>

The different types of GATC's do differ somewhat in their method of production. Peltier-effect GATC's are manufactured by assembling the four main assemblies: the logic circuit board, the power circuit board, the sheet metal housing with keypad, and the thermoelectric "alpha unit." Its manufacture is thus "electronic" in nature. The process of manufacturing vapor-compression GATC's is somewhat different, inasmuch as the cooling unit consists largely of mechanical rather than electronic subassemblies. The manufacture of the components is greatly different from the manufacture of electronic subassemblies, and

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<sup>5</sup> I note that most "heat-only" GATC's can obtain close to 0° C. if attached to a cold water source. However, the necessary temperature for the gene amplification reaction takes place at a temperature sufficiently in excess of 0°C. to permit their use in most applications.

<sup>6</sup> Staff Report at A-2-3.

<sup>7</sup> However, since the "ambient" temperature could include the temperature of a cold water source close to 0°C, this limitation, in practice, would not necessarily be a major restriction on the use of such a system, particularly, as stated above, when the actual temperatures used in the reactions for which GATC's are used are generally in excess of 0°C.

<sup>8</sup> There are alleged differences in the degree to which particular GATC's provide uniform heating and cooling and the speed with which they achieve their programmed temperatures. I do not believe that these differences, to the extent they exist, are sufficient to differentiate GATC's for purposes of the Commission's like product determination.



involves a larger amount of capital equipment.<sup>9</sup>

There is no indication that the production of the control units or sample blocks for the different types of GATC's are different, however. While there is little specific information about the production of heat-only units, such units usually employ for their heating the same kinds of sample blocks and electrical resistance heating used in the manufacture of some of the Peltier-effect units and the vapor-compression units.

Based on the information available, it appears that the different types of thermal cyclers involve some but not all of the same production processes. Generally, however, they do not share common manufacturing facilities and production employees because no domestic manufacturer produces more than one type of GATC. Because of the differences in components, many of the subassemblies would not be interchangeable.

All U.S. producers and importers agreed that the three types of GATC's compete to some degree in the marketplace.<sup>10</sup> Vapor-compression GATC's, proprietary to a single producer, are more expensive than Peltier-effect GATC's, and Peltier-effect GATC's are generally more expensive than heat-only GATC's. The different types of GATCs have price structures that appear to be related to market perception of each firm's product as well as to either the production cost or real features of the machine.<sup>11</sup> The producers of all types of GATCs sell through distributor networks and/or directly to end-users.<sup>12</sup>

Based on the information in this preliminary investigation, I find one like product consisting of all three types of GATC's. Heating and cooling is the essential feature of the GATC. As discussed above, the different types of thermal cyclers differ in the inner workings of the heating and cooling system. While these differences do have an effect on manufacturing processes, price, end use (to a limited extent), overall, the different types of

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<sup>9</sup> Report at A-6.

<sup>10</sup> Report at A-26.

<sup>11</sup> Report at A-26.

<sup>12</sup> Report at A-12-13.

GATC's are used for essentially the same purposes and are interchangeable by the vast majority of end users.<sup>13</sup> Further, I find that the principal subassemblies of the Peltier effect machines, which are proprietary to the machines in which they are used and are usually manufactured directly by or at the direction of the GATC manufacturers, should be treated as part of the single GATC like product.

### Domestic Industry

Because the like product includes all GATC's, the domestic industry will be composed of the domestic producers of GATC's, the petitioner (MJ Research); Coy Corporation; Perkin-Elmer Cetus; BioTherm; Eppendorf Inc.; Ericomp Inc.; Precision Scientific; Lab-Line Instruments; and Sutter Instrument.<sup>14</sup>

### Condition of the Domestic Industry

Traditionally, the Commission analyzes the condition of the domestic industry by interpreting various indicators of the performance of the domestic industry. These include what are referred to as production-related or "trade" indicators, such as production, capacity,

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<sup>13</sup> This is further evidenced by the fact that several customers who cancelled their order with petitioner substituted the Peltier-effect machine with other technologies. Staff Report at A-29-30.

<sup>14</sup> Respondent alleges that petitioner does not have standing to bring this petition. Respondent bases this argument on a definition of the domestic industry encompassing the domestic producers of all GATCs, a definition which I believe appropriate.

However, the Commission has previously held that it defers to Commerce's statutory authority to determine the sufficiency of petitions filed under the statute, including standing, and that the Commission therefore does not rule on a petitioner's standing. Although one can interpret the Suramerica decision to question the Commission's position, that decision is on appeal and, in any event, does not require the Commission to determine standing issues.

The Commission can and does uncover information in the course of its investigation, that Commerce could find relevant for any decision it might decide to make on a standing question. Therefore, I note the following. Defining the industry as I do to be all domestic producers of GATC's, only a minority of domestic production is represented by those producers who have "supported" the petition. Producers of a large percentage of domestic production, however, have not expressed opposition to the petition but rather have taken the neutral position of neither supporting or opposing the petition. To repeat my view, the drawing of any legal conclusion from these facts as to whether petitioner has standing to bring this petition for antidumping duties is the responsibility of the Department of Commerce, not the International Trade Commission.

capacity utilization, shipments and inventories; employment indicators, such the number of production and related workers, hours worked, compensation, and productivity; and financial indicators, including net sales, cost of goods sold (COGS), operating income margins and returns to assets ratios. By examining these indicators over several years, the Commission makes a judgement as to whether the industry is currently experiencing material injury (or in a threat case whether it is vulnerable to material injury).

This investigation presents a peculiar difficulty in analyzing the data. A significant number of the companies comprising this industry did not begin operations until 1988. In many cases, production or sales did not begin until very late in that year. This means that for practical purposes, we have data only for a partial year, 1988, one full year, 1989, and interim data for 1990. An analysis of trends is of very limited use. Further, complicating any discussion of the condition of the industry is the limited number of producers and their disparate size. Much of the data is thus confidential and cannot be discussed in our views.

The alternative to a present injury analysis to avoid the limited data for this industry would be a material retardation analysis. This industry is, realistically, only about two years old. It can therefore be viewed as a nascent industry for which material retardation would be a more appropriate standard of analysis. The advantage of the material retardation standard is that it is less reliant on analysis of data from multiple years, an obvious impossibility in this case. It is however, a more subjective standard as it measures the observed data against of standard of what it is reasonable to expect in the early years of an industry.

The Commission has rarely employed the material retardation standard, however, and never, it appears in a situation comparable to the one presented here. I note that petitioner did not present its case as one of material retardation, and provided no direct evidence of what it would view as reasonable performance in light of the "youth" of the industry. Many of the issues which arose in the course of the investigation, however, are those of companies attempting to establish themselves in a new market and the material retardation analysis is therefore not inappropriate. I have therefore analyzed the condition of this industry on both

a present injury and material retardation basis. Under neither standard is an affirmative finding justified.

Looking first at the trade data, I see an industry experiencing explosive growth. Full year 1989 production is more than substantially above the production in admittedly a partial 1988. Interim 1990 production is substantially higher than interim 1989 production. The trend in shipments is similar. Both have outstripped the growth in consumption at the present time. I note that the companies responding to the Commission's investigation see the likelihood of continued explosive growth for this industry as new applications, particularly clinical applications for GATC, are readily foreseeable in the near future.<sup>15</sup>

Capacity is also expanding rapidly, though at different rates for different types of GATC's. I note that production of GATC's is not generally a capital intensive endeavor and capacity can be expanded quickly and relatively easily. The principal limitation on capacity expansion relates specifically to Peltier-effect technology and concerns the limited availability of reliable Peltier-effect thermoelectric units, a problem particularly important for those companies which use the Peltier effect for both heating and cooling.<sup>16</sup>

Employment indicators also reveal a rapidly expanding industry. Looking at the interim periods, the number of production related employees more than doubled, as did total compensation. Hours worked increased substantially and productivity also increased. Hourly compensation increased significantly. There is no indication in these indicators of an industry experiencing material injury or doing less well than one would expect for a nascent industry.

The financial data is somewhat compromised in this investigation because the largest U.S. producer, which is characterized as "uninterested" in the investigation, refused to provide any financial information. I note however that this producer's GATC is priced substantially higher than any other GATC that we investigated. Because of its refusal to provide

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<sup>15</sup> The future is somewhat less bright for heat-only machines which are likely to be displaced in the market by "active" cooling GATCs. This a technological problem not one associated with imports.

<sup>16</sup> Use of the Peltier-effect units for both heating and cooling is more "stressful" for the units and thus requires a higher quality unit.

information, its "uninterest" in the investigation, and its position in the market, I find it reasonable to infer that its data would not be reflective of material injury and that is doing as well as it reasonably expects.

The data we do have also is not, in my assessment, reflective of material injury or material retardation. The only financial indicator which in my view could possibly give any support to a finding of material injury is the operating income margin in the interim periods. However, the gross profit margins for the same periods are not indicative of material injury. After closer examination of the statistical, accounting, and other factors affecting the difference between these two profitability indicators, I conclude that not even the operating income margin should be viewed as reflective of material injury or material retardation.

I conclude that the industry is not currently experiencing material injury. Neither is the data reflective of an industry doing less well than would be expected for an industry in the early phases of its operations trying to establish itself. This is particularly evident in the gross profit margins, and operating income to assets ratios. The differences between gross and operating profits are also reflective of the normal changes experienced by start-up companies involved in the early stages of a product cycle. Technical problems with products (i.e. "bugs") that require additional expense to work out, problems with suppliers and distributors, and the beginning of management "draws" on the profits as companies achieve what their owners view as a sufficient market presence, all affect the operating results of the companies in ways precisely as we see in this investigation.

The final element in my assessment of the condition of this industry is my evaluation of the relative vulnerability of the industry. On the one hand, companies in the early phase of product introduction would tend to be somewhat more vulnerable to material injury or material retardation than would well-established companies with well-established products. On the other hand, there is clearly exponential growth in the market for GATC's. Production of GATC's does not appear to involve extremely large capital or R&D outlays. Sales have been, and continue to be, extremely profitable. In summary, this is not an industry on the edge of material injury.

**Causal Nexus Between the Condition of the Industry and Alleged LTFV Imports**

There were no imports subject to this investigation brought into the United States during the period of investigation until the interim period of 1990. Of the small quantity entered in that period the great majority were sold to end users, while the remainder were inventoried for future sale. The imports accounted for a small percentage of total domestic consumption. These volumes were not sufficient to be a cause of material injury to, or to materially retard the establishment of, the domestic industry.

Prices of GATC's varied considerably by producer. Vapor-compression GATC's commanded the highest price, while heat-only GATC's commanded the lowest price. Peltier-effect GATC's, whether full heat/cool Peltier-effect or resistance heat/Peltier-effect cool machines fell in between. Generally, price charged by producers for their machines remained stable throughout the period. There is no evidence of a pattern of underselling or any other evidence that would indicate the existence of any price suppression or depression.

The causation issue in this case is the story of the troubled relationship between petitioner, MJ Research, a manufacturer of full Peltier heat/cool GATC's, and USA Scientific Plastics, a distributor of laboratory supplies and instruments. After entering into a nonexclusive distributorship arrangement with petitioner, USA Scientific quickly became the largest source of sales of MJ Research's GATC's. As amply demonstrated at the Commission's conference, the relationship between the two companies soured. Each, quite naturally, blames the other. I believe that each truly believes that the other was the cause of the breakdown.

It is not the purpose of the Commission to assess why the relationship between MJ Research and USA Scientific broke down. It is not surprising the MJ sales efforts suffered a setback when its largest distributor dropped its line. That MJ Research made fewer sales in the months following the departure of its largest distributor is natural. It is significant, however, that, as claimed by USA Scientific at the conference and established by the record, USA Scientific paid more for the product it obtained from its new supplier in the United Kingdom than it was paying MJ Research. Further, it is significant that it sold the new

GATC, which is a resistance heating/Peltier-effect cooling GATC, for the same or higher prices than the MJ Research GATC and higher than the directly comparable domestically produced resistance heating/Peltier-effect cooling GATC.

The Commission also examined the lost sales allegations made by MJ Research. These involved a number of back orders for GATC's made through USA Scientific who eventually terminated their orders for the MJ Research GATC and purchased the imported machine offered by USA Scientific. The conclusion I draw from these investigations is that they were not generally lost to MJ Research on the basis of price but rather, generally, from the quicker availability of the imported machine or other reasons not affected by price. The alleged LTFV imports were not a cause of any problems for the domestic industry.

Thus, even were the condition of the domestic industry to be viewed as materially injured or materially retarded, which it is not, the alleged LTFV imports are not a cause of such injury or material retardation.

### **Threat**

The Commission is directed by the statute<sup>17</sup> to consider a number of relevant economic factors in assessing threat; the presence or absence of any threat factor shall not necessarily give the Commission decisive guidance.<sup>18</sup> The Commission is directed to consider:

- (1) if a subsidy is involved, information that the Commission has available to it as to the nature of the subsidy;
- (2) the ability and likelihood of the foreign producers to increase the level of exports to the United States due to increased production capacity or unused capacity;
- (3) any rapid increase in penetration of the U.S. market by imports and the likelihood that the penetration will increase to injurious levels;
- (4) 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;
- (5) any substantial increase in inventories of the merchandise in the United States;

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<sup>17</sup> 19 U.S.C. 1677(7)(F). We note that this provision applies in both the subsidy and LTFV contexts.

<sup>18</sup> Rhone Poulenc S.A. v. United States, 592 S. Supp. 1318, 1324 n. 18 (CIT 1984).

- (6) underutilized capacity for producing the merchandise in the exporting country;
- (7) any other demonstrable adverse trends that indicate the probability that importation of the merchandise will be the cause of material injury;
- (8) the potential for product shifting.
- (9) in investigations concerning both raw agricultural products and processed products, product shifting between the two products.
- (10) actual and potential negative effects on the development of derivative or more advanced products.<sup>19</sup>

The threat of injury must also be real and imminent. The Commission will also consider the effects of dumping or subsidy findings in other countries.

As I have indicated in the past, in analyzing threat, I focus on the capabilities and intentions of the foreign industry with regard to imports into the United States in light of the vulnerability of the domestic industry. As I have indicated previously, I do not view this industry as highly vulnerable to the effects of imports. With regard to the volume of imports, I believe it is likely that the volume of imports will rise substantially. Judging from USA Scientific's success with MJ Research's product, it is likely to sell a good number of machines, whether they are domestically-produced or imported machines. I also recognize that USA Scientific is not the only seller of GATC's from the United Kingdom.

Further, I do not view production capacity, which is very flexible for the production of GATC's, to place a tight cap on the ability of the foreign industry to produce more machines. Capacity can expand easily to meet any foreseeable increase in sales. In this investigation, I discount capacity and capacity utilization data as a significant limitation on production.

However, the market for GATC's is expanding exponentially. While the percentage increase in imports is large, I must also consider that it is an increase from a base close to zero. Therefore, while I believe an increase in import volume to be likely, I do not believe that the probable increase in volume alone is enough to justify an affirmative determination.

When I examine pricing, I note that there is no evidence to justify a finding that imports have had or are likely to have a price suppressing or depressing effect on the sales of

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<sup>19</sup> 19 U.S.C. § 1677(7)(F)(i)(I through X).



the domestic industry. My conclusion regarding pricing are stated above in connection with my analysis of causation. I find no evidence which would lead me to believe that these imports will have some effect in the reasonably imminent future which they have not heretofore had. Inventories are not large either domestically or for the imports and I do not view them as a significant problem for the industry, particularly in the rapidly expanding phase in which it currently finds itself.

I find no other adverse trends or factors that would provide a reasonable indication that the alleged LTFV imports from the United Kingdom are likely to cause material injury to the domestic industry in any reasonably imminent time frame. I note there are not outstanding dumping findings against these products. I find that research efforts in this industry appear to focus on new applications and perfecting the existing technology and production methods for which the returns appear adequate. I find no reasonable indication that imports threaten this industry.

#### **Likelihood and Effect of Contrary Evidence**

Under the standard for preliminary investigations traditionally used by the Commission and enunciated by the Court of Appeals for the Federal Circuit in American Lamb,<sup>20</sup> in order to find there is no reasonable indication of material injury, threat, or material retardation, not only must I find that there is clear and convincing evidence of no such injury, threat, or material retardation, but also that there is no likelihood of contrary evidence if a final investigation were to be conducted. In this investigation, I do so find.

The only major gap in the Commission's investigation concerns information from one member of the domestic industry, which is admittedly a major producer. That producer has no connection with the imports subject to this investigation and does not apparently feel affected by such imports. The evidence of record supports the contention that that producer is, at least for now, relatively indifferent to such imports. I do not believe it would be

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<sup>20</sup> American Lamb Co. v. United States, 785 F. 2d 994 (Fed. Cir. 1984).

appropriate in this situation to continue the investigation solely to obtain more information from it.

We have also obtained a significant amount of information about the two sources of GATC's from the United Kingdom that have been imported during the investigation. Additional information from these sources is unlikely to be contrary to that which I relied in making my negative finding. A negative determination is therefore appropriate.

## INFORMATION OBTAINED IN THE INVESTIGATION

## Introduction

On November 14, 1990, MJ Research, Inc., Watertown, MA, filed a petition with the U.S. International Trade Commission (Commission) and the U.S. Department of Commerce (Commerce) alleging that an industry in the United States is materially injured and threatened with material injury by reason of imports from the United Kingdom of Peltier-effect in vitro gene amplification thermal cyclers and subassemblies thereof,<sup>1</sup> provided for in subheadings 8419.89.50 and 8419.90.90, respectively, of the Harmonized Tariff Schedule of the United States, that are alleged to be sold in the United States at less than fair value.<sup>2</sup> Accordingly, effective November 14, 1990, the Commission instituted investigation No. 731-TA-485 (Preliminary) under section 733(a) of the Tariff Act of 1930 (19 U.S.C. § 1673b(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 from the United Kingdom of Peltier-effect in vitro gene amplification thermal cyclers and subassemblies thereof.

The statute directs the Commission to make preliminary determinations within 45 days of receipt of the petition or, in this case, by December 31, 1990. Notice of the institution of this investigation and of a 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 November 20, 1990 (55 F.R. 48302). Commerce published its notice of initiation in the Federal Register of December 13, 1990 (55 F.R. 51307).<sup>3</sup> The Commission held a public conference on December 5, 1990, at which time all interested parties were

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<sup>1</sup> For purposes of this investigation, gene amplification thermal cyclers are defined as micro-processor-based reaction controllers that regulate temperatures of biologic reagents through a programmed and highly controlled thermal regime. The product incorporates a metal sample block, one or more thermoelectric modules, one or more electronic thermal sensors, a heat exchanger, power supply circuitry, microprocessor-based logic circuitry, software, and a housing or enclosure. Peltier-effect in vitro gene amplification thermal cyclers use one or more thermoelectric modules for cooling the biologic samples, and the thermoelectric modules and/or electric resistive heaters for heating the biologic samples. Subassemblies of Peltier-effect gene amplification thermal cyclers that are included in the scope of this investigation are discussed in the section of this report entitled "Description and uses." Excluded from the scope of this investigation are vapor-compression gene amplification thermal cyclers, which use a reversed Rankine cycle apparatus, and heat-only gene amplification thermal cyclers.

<sup>2</sup> The petitioner also alleged "critical circumstances" with regard to the imports.

<sup>3</sup> Copies of the Commission's and Commerce's Federal Register notices are presented in app. A.

allowed to present information and data for consideration by the Commission.<sup>4</sup> The Commission's briefing and vote in this investigation was held on December 27, 1990.

The Commission has conducted no previous investigations on in vitro gene amplification thermal cyclers (hereafter referred to in this report as GATCs) or subassemblies thereof.

## The Products

### Description and uses

The imported products subject to this investigation are Peltier-effect in vitro<sup>5</sup> GATCs and subassemblies thereof. GATCs are microprocessor-based reaction controllers that regulate temperatures for small quantities of biologic reagents through a programmed and highly controlled thermal regime. They are used in biotechnology applications, including a biological protocol called in vitro gene amplification, as well as in several related sequencing and radionucleotide<sup>6</sup> labeling reactions. Peltier-effect machines use one or more thermoelectric modules for cooling biological samples, and the thermoelectric modules and/or electric resistive heaters for heating the biological samples. The following subassemblies are included in the scope of this investigation when they are manufactured according to specifications and operational requirements for use in a GATC: (a) the sample block/thermoelectric module/sensor/heat exchanger subassembly, which consists of the sample block, one or more thermoelectric modules, one or more electronic thermal sensors, and a heat exchanger, and which can include an electric resistive heater; (b) the housing or enclosure, whether finished or unfinished, of the GATC; (c) the membrane keypad used to program and control a GATC; and (d) the software to operate the GATC.

In vitro gene amplification is a new biochemical technique that allows scientists to take minute fragments of impure deoxyribonucleic acid (DNA) and amplify the DNA more than a millionfold in just a few hours through an automated procedure. The sample of DNA is combined with specific biologic reagents, then cycled repetitively through a highly specific thermal regime. Applications for the amplified DNA include much improved tests, such as for AIDS detection, diabetes, residual leukemia, lymphoma, and oncogene-linked cancers.

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<sup>4</sup> A list of witnesses who appeared at the conference is presented in app. B.

<sup>5</sup> "In vitro" relates to a biological process made to occur in a laboratory vessel or other controlled experimental environment, rather than within a living organism or natural setting.

<sup>6</sup> Nucleotide is defined as "any of a group of molecules that, when linked together, form the building blocks of DNA or RNA: composed of a phosphate group, the bases adenine, cytosine, guanosine, and thymine, and a pentose sugar, in RNA the thymine base being replaced by uracil." (The Random House Dictionary of the English Language, Second Edition, unabridged, 1987.)

The first reported sale of GATCs was in \*\*\*. Such introduction followed the discovery in 1985 of how to duplicate DNA and the development of the DNA-duplicating enzyme by Perkin-Elmer Cetus in 1987. Prior to the introduction of GATCs, the only similar types of equipment available were simple devices such as plastic bowls and hot plates. Some laboratory tests had been made by laborious and expensive blotting techniques, whereas for some diseases, such as cancerous conditions, no other laboratory techniques existed that could effectively distinguish the variations of the disease.

The petition identifies three types of GATCs: (1) the Peltier-effect type; (2) the vapor-compression type; and (3) the heat-only type.<sup>7</sup> Although there may be considerable differences in engineering, price, and performance among the types,<sup>8</sup> much of the sales literature associated with GATCs indicates that they are intended to serve many of the same markets.<sup>9</sup>

Peltier-effect GATCs.--Peltier-effect GATCs use one or more Peltier-effect heat pumps, which are thermoelectric modules (solid-state electronic devices) for heating and/or cooling; some Peltier-effect GATCs have electric

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<sup>7</sup> Petition, p. 11.

<sup>8</sup> At least two recent trade journal articles have evaluated the three types of GATCs. An article in Trends in Genetics, vol. 6, no. 8, August 1990, indicated that Peltier-effect GATCs were superior in consistency and equality of amplification in all wells than the other GATCs tested. An article in BioTechniques, vol. 9, no. 3, September 1990, found that the GATCs tested (a vapor-compression Perkin-Elmer Cetus GATC, a heat-only Hybaid™ GATC, and a heat-only Biomed GATC) did not satisfactorily fulfill the requirement of guaranteeing temperature homogeneity for all samples of an individual run and run-to-run comparability. However, staff spoke \*\*\*.

<sup>9</sup> For example, the imported Peltier-effect GATC of LEP Scientific is identified as "...ideal for restriction enzyme digestion, preparative work for DNA sequencing analysis, 'In-vitro' enzyme-mediated techniques, plus numerous biochemical reactions where precise control of temperature and time is essential" (petition Exhibit F, "Gene Machine II," from USA/Scientific Plastics). Perkin-Elmer Cetus advertises that its vapor-compression unit has "...the ability to produce amplified DNA for a variety of research applications [such as] DNA hybridization, subcloning, restriction site creation, site-directed metagenesis, sequencing, genetic probes, DNA footprinting, and protein/DNA interaction" (sales literature from Perkin-Elmer Corp., "Optimizing the PCR Advantage, The Perkin-Elmer Cetus DNA Amplification System," Order No. L-1072C, April 1990). Hybaid™ thermal reactors, heat-only cyclers imported from the United Kingdom, are said to have applications that include "denaturation kinetics, restriction enzyme digests, DNA sequencing, and RNA and DNA probes" (sales literature from PGC Scientifics Corp. (National Labnet) covering the Hybaid™ thermal reactor, identification No. 465, undated). Ericomp, Inc., a U.S. manufacturer of the heat-only type of thermal cycler, advertises that its product is "...ideally suited for lab experiments that require the ability to heat and cool test samples automatically through repeated cycles for any of several user-defined time intervals and temperatures ranging from 25° to 100° Centigrade" (a higher upper limit on the low end than certain other producers) (sales literature from Ericomp, Inc., covering the Easy Cycler™ Series, including price list dated May 1, 1990.)

resistive heaters. The manner of operating is as follows: Biological samples are placed in small, individual, disposable, plastic vessels, or in a disposable, plastic, microtiter<sup>10</sup> plate. These plastic vessels or plates are then inserted into a metal sample plate that is attached to the Peltier-effect heat pumps or thermoelectric modules, which are attached on the other side to a heat exchanger. A microprocessor controller inside the GATC operates a power supply circuit, which supplies varying quantities of electricity to the thermoelectric heat pumps and/or the resistive heater.<sup>11</sup> By varying the current and polarity, the controller can precisely cycle the temperature of the sample block and its biological samples through a programmed thermal regime, with excess heat exhausted to ambient air through the heat exchanger. Each temperature cycle usually incorporates several different temperatures, generally ranging from about 4° to 100° Centigrade, and changes in temperature in the sequence must occur accurately and rapidly.

The Peltier-effect GATCs marketed by the petitioner and the respondent both incorporate a metal sample block, thermoelectric modules, electronic thermal sensors, a heat exchanger, power supply circuitry, microprocessor-based logic circuitry, proprietary software, and sheet metal housing. The petitioner's GATC has two Peltier devices, whereas the respondent has a four-device configuration.<sup>12</sup> In addition, the respondent's Peltier-effect cyclers includes interchangeable sample blocks, a printer port, and an extra thermocouple probe used for self-calibration. The petitioner's GATC and the \*\*\* GATC of Savant Corp. use Peltier-effect heat pumps for both heating and cooling, whereas the respondent's (and also that of Coy Corp., the other U.S. producer of Peltier-effect GATCs) use Peltier-effect heat pumps for cooling, but resistive heaters for heating.<sup>13</sup> Figure 1 depicts a Peltier-effect GATC.<sup>14</sup>

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<sup>10</sup> Titer refers to the strength of a solution as determined by titration with a standard substance or the concentration of a substance in a given sample as determined by titration. To titrate is to ascertain the quantity of a given constituent by adding a liquid reagent of known strength and measuring the volume of reagent necessary to convert the constituent to another form.

<sup>11</sup> Peltier-effect GATCs are controlled electronically rather than mechanically, as are vapor-compression GATCs. With the Peltier-effect GATCs, all of the motors, pumps, compressors, valves, high-pressure lines, seals, and connectors are replaced by the thermoelectric module.

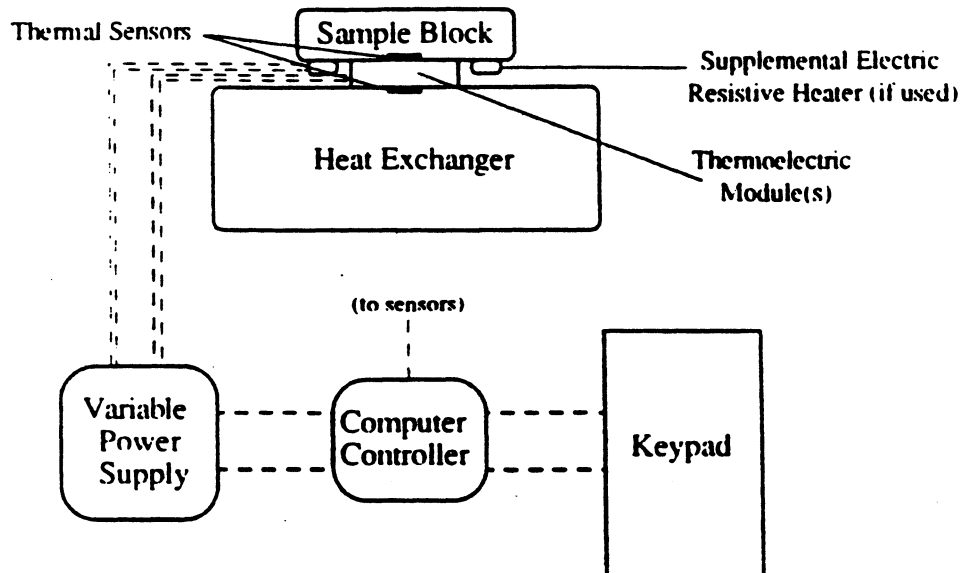
<sup>12</sup> Post-conference brief of Howrey and Simon, p. 41.

<sup>13</sup> In a Dec. 7, 1990 telephone conversation with Commission staff, \*\*\*.

<sup>14</sup> With regard to the comparison between Peltier-effect and heat-only GATCs, the petitioner contends that Peltier-effect GATCs are superior in reproducibility, functionality, and convenience. The reproducibility of samples is allegedly superior because of better temperature consistency and accuracy; the functionality is allegedly superior, especially for the enzymatic manipulation of DNA (heat-only GATCs allegedly cannot be used for "ligation reactions and below ambient radiolabelling reactions"); and convenience is allegedly superior because Peltier-effect GATCs may be located anywhere electric power is available whereas many heat-only GATCs require connection to a source of tap water for cooling (post-conference brief of MJ Research, p. 2, and conference exhibit #1, affidavit of Dr. Michael J. Finney, Chief Scientist, MJ Research, and Research Fellow, Dept. of Molecular Biology, Massachusetts General Hospital and Department of Genetics, Harvard Medical

(continued...)

Figure 1  
Peltier-effect GATC



Source: MJ Research, Inc.

Peltier-effect GATC subassemblies.---The petitioner identified four subassemblies that are unique to Peltier-effect GATCs. The first is the sample block/thermoelectric module/sensor/heat exchanger subassembly, which includes the sample block, a precisely machined metal block designed to hold one or more of the four types of reaction vessels generally used. Other components of this assembly include thermoelectric modules, two or more temperature sensors, perhaps an electric resistive heater, and a heat exchanger. Of these components, only the heat exchanger is unique, since, as assembled, its only use would be as part of a Peltier-effect GATC.

The second subassembly is the sheet metal housing. The third subassembly is the membrane keypad used to program and control the machine; the specific keypad is almost always built to the specifications of the final manufacturer. The last subassembly is the proprietary software of the thermal

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<sup>14</sup> (...continued)  
School).

The petitioner also contends that Peltier-effect GATCs are technologically different from vapor-compression GATCs, are superior to vapor-compression GATCs, e.g., allegedly have more precise electronic control and more even heating and cooling, and are also substantially lower in price (petition, pp. 16, 17, and post-conference brief of MJ Research, pp. 3, 4).

The respondent contends that it is not possible to find a clear dividing line among GATCs, and that all GATCs constitute one "like" product (post-conference brief of respondent, p. 6.)

cycler; such a programmed microchip would be wholly unique to the type of GATC for which it was programmed.

The petitioner's membrane keypads and sheet metal housings are designed to its own specifications and are then purchased. The petitioner writes its own software, and it is specific to the MJ Research machine. With regard to the principal subassembly (the sample bloc/thermoelectric module/sensor/heat exchanger subassembly), it is designed and assembled in-house.<sup>15</sup>

Vapor-compression GATCs.--Vapor-compression GATCs are manufactured only by Perkin-Elmer Cetus, and were one of the first GATCs introduced in the U.S. market. Vapor-compression machines use a reversed Rankine cycle apparatus, which is a mechanical heat pump, in order to cool the sample, whereas heating is achieved through the use of electric resistive heaters. Such heaters are attached to the sample block for heating, and for cooling, the cycler uses a circulating cooling fluid that passes through channels in the sample block itself. The coolant is chilled by a vapor compression apparatus moving a refrigerant (a fluorocarbon) through a thermodynamic cycle; a mechanical expansion valve releases the high-pressure refrigerant into an expander. Figure 2 depicts the operation of a vapor-compression GATC.

Heat-only GATCs.--Heat-only GATCs use electric resistive heaters to heat a sample block, a water bath, or the actual sample vessels. Cooling is accomplished by passing ambient air or tapwater over a heat exchanger attached to the block, bath, or vessel. Unlike the Peltier-effect and the vapor-compression GATCs, the heat-only type cannot actively pump heat, nor is it capable of attaining refrigeration temperatures, unless an external water source or chiller is added (which raises its cost closer to that of the other types of GATCs). According to the petitioner, heat-only machines cannot refrigerate biological samples following the completion of a gene amplification procedure, which compromises their use by laboratories that run reactions overnight. The operational layout of a heat-only GATC is shown in figure 3.

#### Manufacturing process

The process of manufacturing Peltier-effect GATCs consists of assembling the four main components: the logic circuit board, the power circuit board, the sheet metal housing with keypad, and the sample block/thermoelectric module/sensor/heat exchanger subassembly, referred to as the "alpha unit" by MJ Research. The logic--or computer--board and the power board are designed and assembled from individual components, usually supplied by various

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<sup>15</sup> John Finney, President of MJ Research, Inc., testified at the conference that with regard to subassemblies, "...the final assembly of them is a fairly intensive operation which involves the integration of electrical and mechanical components into a working system: the testing, debugging, reconstruction and ultimate calibration which is no small part of the task. Achieving the type of temperature accuracy that we do in these machines requires a multistep process of calibration using the Bureau of Standards thermometers and such things." (Conference transcript, p. 86).





The diagram illustrates the experimental setup for measuring the thermal conductivity of a sample. The components and their connections are as follows:

- Sample Block, Water Bath, or Sample Plate:** The central component being measured, connected to the Thermal Sensor and the Electric Resistive Heater.
- Thermal Sensor:** Connected to the Sample Block and the Computer Controller.
- Electric Resistive Heater:** Connected to the Sample Block and the Computer Controller.
- Heat Exchanger:** Connected to the Sample Block and the Water valve or air fan.
- Water valve or air fan:** Connected to the Heat Exchanger and the Computer Controller.
- Ambient air or water:** Connected to the Heat Exchanger and the Computer Controller.
- Electrical Switches:** Connected to the Computer Controller.
- Keyboard:** Connected to the Computer Controller.

The Computer Controller is the central unit that manages the data collection and control of the experiment. It is connected to the Thermal Sensor, Electric Resistive Heater, Water valve or air fan, Ambient air or water, Electrical Switches, and the Keyboard.

**Source: MJ Research, Inc.**

electronics distributors. The sheet metal housing and the keypad are manufactured, usually by outside suppliers, to fit the producer's specifications. The "alpha" components, with the exception of temperature sensors, are manufactured by or for the producer. The "alpha" unit, consisting of two thermoelectric modules, two temperature sensors, a heat exchanger, insulation, and a sample block, is then assembled and calibrated by the GATC producer.<sup>16</sup>

The process of manufacturing vapor-compression GATCs is somewhat different from that of Peltier-effect GATCs. The vapor-compression GATC consists largely of mechanical subassemblies, including a circulating coolant system with motors and valves, and a vapor-compression unit with high-pressure lines and a pump that moves a chlorofluorocarbon working fluid through a phase change. The manufacture of these components is greatly different from the manufacture of electronic subassemblies, involving a much larger quantity of capital equipment. The production process is more capital intensive and involves a somewhat different set of skills and equipment than the manufacturing process of Peltier-effect GATCs.<sup>17</sup>

The production processes for heat-only GATCs vary somewhat, both from those of Peltier-effect GATCs and vapor-compression GATCs, and among the various producers of heat-only GATCs.

In response to the question "Could you produce another type of gene amplification thermal cyclers on the same equipment and machinery on which you produce your current type of thermal cyclers?", \*\*\* responded "No," whereas \*\*\* responded "\*\*\*."

#### U.S. tariff treatment

GATCs are provided for by the U.S. Customs Service under Harmonized Tariff Schedule of the United States (HTS) subheading 8419.89.50, whereas subassemblies thereof are provided for in HTS subheading 8419.90.90. The current most-favored-nation rate of duty, applicable to the United Kingdom, is 4.2 percent ad valorem for HTS subheadings 8419.89.50 and 8419.90.90.

#### Nature and Extent of the Alleged Sales at LTFV

To calculate the estimated dumping margins for Peltier-effect GATCs from the United Kingdom, the petitioner compared the adjusted U.S. price (purchase price) of the subject product with the adjusted foreign price. The LTFV margins, as recalculated by Commerce, ranged from 46.21 percent to 55.15 percent.

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<sup>16</sup> \*\*\*.

<sup>17</sup> \*\*\*.

## The U.S. Market

Apparent U.S. consumption

Apparent U.S. consumption, as presented in this report, is calculated from U.S. shipments of both U.S. producers and importers, based on questionnaire responses (table 1).

Table 1

GATCs: Apparent U.S. consumption, by types, 1987-89, January-September 1989, and January-September 1990

\*                    \*                    \*                    \*                    \*                    \*

Apparent U.S. consumption of Peltier-effect GATCs rose from \*\*\* units in 1987 to \*\*\* units valued at \$\*\*\* in 1988, and to \*\*\* units valued at \$\*\*\* in 1989. Consumption further rose by \*\*\* percent by quantity, and by \*\*\* percent by value, from January-September 1989 to January-September 1990.

Apparent U.S. consumption of Peltier-effect GATCs as a share of total U.S. consumption of the combined types of GATCs rose, by quantity, from \*\*\* percent in 1988 to \*\*\* percent in 1989, but declined, by quantity, from \*\*\* percent in January-September 1989 to \*\*\* percent in January-September 1990.

Total reported apparent consumption of all types of GATCs, combined, more than doubled, by quantity, from 1988 to 1989, and further rose by \*\*\* percent from January-September 1989 to January-September 1990. In terms of value, total reported apparent U.S. consumption increased by \*\*\* percent from 1988 to 1989 and rose by \*\*\* percent from January-September 1989 to January-September 1990.

U.S. producers

The U.S. Peltier-effect GATC industry is only two to three years old. The only two domestic producers of Peltier-effect GATCs, MJ Research, Inc. (the petitioner) and Coy Corp., began production in \*\*\*. Since then, the demand for Peltier-effect GATCs has consistently outstripped supply, and the industry continues to undergo rapid development. In vitro gene amplification is a new biochemical technique,<sup>18</sup> heralded in the New England Journal of Medicine as "clearly one of the most substantial technical advances in molecular genetics in the past decade."<sup>19</sup> Both the petitioner and the respondent, the \*\*\* importer of the subject product, assess that this technology soon will be widely available for clinical application.

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<sup>18</sup> The petitioner asserts that the in vitro gene amplification process and the Peltier-effect thermal cycler technology were wholly developed within the United States (Petition, p. 5; conference transcript, pp. 8-9.) The respondent counters that worldwide experimentation in product development occurred simultaneously (respondent's post-conference brief, p. 5).

<sup>19</sup> New England Journal of Medicine, Jan. 18, 1990, 332(3), p. 178.

The Commission mailed questionnaires to 20 companies thought to produce GATCs. Commission staff confirmed that nine companies produce GATCs--two manufacture the subject Peltier-effect GATCs; one, vapor-compression GATCs; and six, heat-only GATCs. Several firms reportedly are developing a Peltier-effect or heat-only product, but have not yet begun production. Rumors have circulated in the industry that \*\*\* is perfecting a heat-only product. But according to company sources, \*\*\*.<sup>20</sup> \*\*\* report they began production of heat-only GATCs in \*\*\* and \*\*\*, respectively.

U.S. producers' names, locations, specific GATC products and position on the petition, are shown in the following tabulation:

<u>Firm</u>	<u>Location</u>	<u>Specific product</u>	<u>Product classification</u>	<u>Position on petition</u>
MJ Research, Inc..	Watertown, MA	Gene Machine	Peltier-effect	Supports
Coy Corp., Inc....	Ann Arbor, MI	Temp Cyclor	Peltier-effect	***
Perkin-Elmer Cetus Corp.....	Norwalk, CT	DNA Thermal Cyclor	Vapor-compression	***
BioTherm Corp.....	Arlington, VA	The BioOven	Heat-only	***
Eppendorf, Inc....	Fremont, CA	Microcyclor	Heat-only	***
Ericomp, Inc.....	San Diego, CA	Easy Cyclor	Heat-only	***
Lab-Line Instruments, Inc.....	Melrose Park, IL	Programmable Thermal Blok	Heat-only	***
Precision Scientific, Inc.....	Chicago, IL	Genetic Thermal Cyclor	Heat-only	***
Sutter Instrument Co.....	Novato, CA	Therma-droid	Heat-only	***

Peltier-effect GATCs.--There are currently two U.S. producers of Peltier-effect GATCs: MJ Research, Inc. (the petitioner) and Coy Corp.

MJ Research, Inc., Watertown, MA, characterizes itself as "biotechnology leaders and innovators."<sup>21</sup> Two brothers--Michael J. Finney and John D. Finney--founded the company in 1986 to manufacture programmable controllers for use in pulse-filled electrophoresis. According to the petitioner, Michael Finney had discovered the utility of this technique while a graduate student at the Massachusetts Institute of Technology. At the time, the petitioner reports, "there were no off-the-shelf controllers on the market suitable for implementing the various pulse-field switching systems, so MJ Research built first two, then twenty, then a hundred such machines." In 1987-88 the company set out to design and build a machine appropriate for implementing gene amplification and other sequencing reactions. Production of the Peltier-effect GATC began in late 1988.<sup>22</sup>

<sup>20</sup> \*\*\*.

<sup>21</sup> Petition, p. 55.

<sup>22</sup> Petition, pp. 6-7; conference transcript, pp. 8-9.

\* \* \* \* \*

Coy Corp, Inc., Ann Arbor, MI, manufactures a Peltier-effect GATC, the Temp Cycler, at the company's headquarters in Ann Arbor. \*\*\*.

Vapor-compression GATCs.--Perkin-Elmer Cetus Corp., Norwalk, CT, is the sole producer of vapor-compression GATCs and the largest producer of GATCs. Perkin-Elmer Cetus has a joint marketing agreement with the Cetus Corp. of California, a biotechnology company that developed the Polymerase Chain Reaction (PCR) system, and is reportedly the world's largest producer of reagents for in vitro gene amplification. Cetus holds the PCR trade name, and Du Pont is suing Cetus over the validity of it patent.

Perkin-Elmer Cetus sells one product, the DNA Thermal Cycler, for automating the PCR process, for which Perkin-Elmer Cetus holds the patent. \*\*\*. Perkin-Elmer Cetus is also licensed under patent applications of Cetus Corp. directed to instrument-automating the PCR process. Perkin-Elmer Cetus has patented the DNA Thermal Cycler, and has other patents pending.<sup>23</sup>

\* \* \* \* \*

Heat-only GATCs.--There are six known producers of heat-only GATCs: \*\*\* responded to the Commission's questionnaire. (In terms of usable data, \*\*\* provided only financial information.) \*\*\* and \*\*\* declined altogether to complete the questionnaires but supplied product and other useful information for the record. \*\*\*, which reports that it started developing the product in \*\*\* and began production in \*\*\*, returned a questionnaire to the Commission with limited information.<sup>24</sup> \*\*\* began production in \*\*\*.<sup>25</sup>

\* \* \* \* \*

#### U.S. importers

U.S. importers' names, locations, and specific thermal cycler products are shown in the following tabulation:

\* \* \* \* \*

The petition named USA/Scientific Plastics as the sole importer of Peltier-effect GATCs from the United Kingdom. However, another firm, \*\*\*, imported \*\*\* Peltier-effect GATCs from the United Kingdom during the period of investigation. While there are no known U.S. imports of vapor-compression GATCs, four U.S. importers buy heat-only GATCs from the United Kingdom.

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<sup>23</sup> Questionnaire; \*\*\*.

<sup>24</sup> \*\*\*.

<sup>25</sup> \*\*\*.

USA/Scientific Plastics, Inc., Ocala, FL, buys Peltier-effect GATCs from LEP Scientific, Ltd. of Linford Wood, Milton Keynes, United Kingdom. USA/Scientific Plastic's first imports of the subject product were in mid-April 1990. The company was founded 8 years ago. Its staff includes 35 employees located in Florida and Massachusetts, and 10 full-time sales people on the road.<sup>26</sup> USA/Scientific Plastics is a former distributor of MJ Research's Gene Machine, and much of the information developed in this investigation pertains to the troubled relationship between the two companies. (See section entitled "Others factors influencing the health of the domestic industry" for a detailed account of the relationship.)

\* \* \* \* \*

Four U.S. companies import heat-only GATCs from the United Kingdom.  
\*\*\*.

#### Channels of distribution

Producers and importers of all types of GATCs sell through a distributor network and/or directly to end users. Sales to distributors are generally made at a substantial discount below list price. These distributors typically perform many sales functions for the producer such as advertising, printing literature, and staging sales demonstrations. Some producers also use manufacturer representatives to sell and promote the product through their contacts with the end user. Sales representatives do not purchase the machines as do distributors, but perform sales services for a specified sales commission. Both producers and distributors generally sell to end users at the recommended list price.

U.S. producers and importers that have an existing distribution system--\*\*\*--sell only to end users. Others such as \*\*\* do not have an extensive distribution sales force and are more likely to sell their GATCs through distributors. It is an advantage to have a sales force or distributor network because it will move the new product to potential purchasers. Moreover, distributors and their sales personnel often have an existing relationship with end users through the sale of other related products, giving them an advantage in sales of GATCs. These relationships are especially important in this industry because sales are generally one GATC at a time.

As shown in the following tabulation, U.S. producers sold over \*\*\* percent of all types of GATCs to end users and \*\*\* percent through distributors during January-September 1990, whereas U.S. importers sold nearly \*\*\* percent of all types of GATCs through distributors and approximately \*\*\* percent to end users. For sales of Peltier-effect GATCs alone, both U.S. producers and importers sold most products directly to end users, however, \*\*\*.

\* \* \* \* \*

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<sup>26</sup> Testimony of Richard E. McDonald, Vice President of USA/Scientific Plastics, Inc., conference transcript, p. 108.

MJ Research reported that it sold GATCs through \*\*\* distributor outlets, USA/Scientific Plastics \*\*\*. However, USA/Scientific Plastics has \*\*\* distributor for MJ Research.<sup>27</sup> USA/Scientific Plastics accounted for \*\*\* percent of total domestic sales of MJ Research's GATCs until the termination of their relationship in March 1990.

U.S. producers and importers reported in their questionnaire responses that over 60 percent of the end users who purchased GATCs during 1989-90 were universities, while an additional 10 to 15 percent of the purchasers were government-related agencies. Other end users cited were research laboratories and pharmaceutical laboratories. GATCs are marketed to these end users through trade shows, printed advertising in journals, and by direct contact.

### Consideration of Alleged Material Injury

The information presented in this section of the report is based on the questionnaire responses of four firms that represent the two known producers of Peltier-effect GATCs, the only known producer of vapor-compression GATCs, and one of the \*\*\* known companies that manufactured heat-only GATCs during the period of investigation. The Commission sent questionnaires to 20 firms believed to produce the subject or possible "like" products.<sup>28</sup>

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

Capacity to produce Peltier-effect GATCs was \*\*\* units in 1989 and increased by \*\*\* percent from January-September 1989 to January-September 1990 (table 2).<sup>29</sup> The increase in capacity is attributable to \*\*\*. Production of Peltier-effect GATCs, which began at the \*\*\*, jumped from \*\*\* units in 1988 to \*\*\* units in 1989, and further rose by \*\*\* percent from January-September 1989 to January-September 1990. Capacity utilization for Peltier-effect GATCs declined by \*\*\* percentage points from January-September 1989 to January-September 1990, due to \*\*\*.

Table 2

GATCs: U.S. capacity, production, and capacity utilization, by types, 1987-89, January-September 1989, and January-September 1990

\*                      \*                      \*                      \*                      \*                      \*

<sup>27</sup> Owl Scientific Plastics is primarily a producer of radiation safety and electrophoresis products. Owl included the MJ Research GATC as well as other MJ Research products in its catalog, \*\*\*. Similarly, MJ Research's catalog carried Owl Scientific Plastics' products.

<sup>28</sup> We requested full data on GATCs and on subassemblies thereof, but no company provided data on subassemblies.

<sup>29</sup> The Commission's questionnaire requested producers of GATCs to report their "full production capability" of GATCs. "Full production capability" is defined as the maximum level of production that can be reasonably expected to be obtained under normal operating conditions.

Capacity to produce vapor-compression GATCs, and actual production of this product, \*\*\* from 1989 to 1990, and \*\*\* from January-September 1989 to January-September 1990. Capacity utilization was reported at \*\*\* percent through the period.

U.S. producers' reported production and share of production, by firm, is shown in table 3. During January-September 1990, MJ Research's production accounted for \*\*\* percent of U.S. Peltier-effect GATC production and \*\*\* percent of total GATC production. Coy Corp. accounted for \*\*\* percent of U.S. Peltier-effect GATC production, and \*\*\* percent of total U.S. GATC production. Together, these two companies comprised \*\*\* percent of the total production of GATCs. Perkin-Elmer Cetus, the sole producer of vapor-compression GATCs, accounted for \*\*\* percent of the total production of all three types of GATCs.

Table 3

GATCs: U.S. production, by firms, January-September 1990

\* \* \* \* \*

#### U.S. producers' U.S. shipments

U.S. producers' U.S. shipments of Peltier-effect GATCs increased from \*\*\* units valued at \$\*\*\* in 1988 to \*\*\* units valued at \$\*\*\* in 1989, and \*\*\* from January-September 1989 to January-September 1990, both by quantity and by value (table 4). U.S. producers' U.S. shipments of vapor-compression GATCs also increased, from \*\*\* units valued at \$\*\*\* in 1988 to \*\*\* units valued at \$\*\*\* in 1989. U.S. shipments of vapor-compression GATCs \*\*\*, by quantity, from January-September 1989 to January-September 1990 and \*\*\*, by value, during this period.

Table 4

GATCs: U.S. producers' U.S. shipments, by types, 1987-89, January-September 1989, and January-September 1990

\* \* \* \* \*

Overall U.S. producers' U.S. shipments of the three types of GATCs rose by \*\*\* percent from 1988 to 1989, by quantity, and by \*\*\* percent by value. Overall producers' shipments further rose by \*\*\* percent from January-September 1989 to January-September 1990, by quantity, and by \*\*\* percent by value.

U.S. producers' U.S. shipments of vapor-compression GATCs accounted for the largest share of total U.S. shipments during the period of investigation. \*\*\*. Combined shipments of Peltier-effect and vapor-compression GATCs accounted for nearly all GATC shipments during the period examined, although these figures are somewhat overstated due to nonreporting of some heat-only GATC producers.



The unit value of Peltier-effect GATCs rose by \*\*\* percent from 1988 to 1989, \*\*\* from January-September 1989 to January-September 1990. The unit value of vapor-compression GATCs \*\*\* by \*\*\* percent from 1988 to 1989 and \*\*\* by \*\*\* percent from January-September 1989 to January-September 1990. The unit values varied substantially by type of GATC, with vapor-compression GATCs having by far the highest unit values and heat-only the lowest.

#### U.S. producers' exports

U.S. producers' exports of all three types of GATCs climbed during the period of investigation, and accounted for a significant share of U.S. producers' total shipments of GATCs (table 5).<sup>30</sup> U.S. producers' exports, as a share of total shipments, rose from \*\*\* percent in 1988 to \*\*\* percent in 1989, and further increased from \*\*\* percent during January-September 1989 to \*\*\* percent during January-September 1990.

Table 5

GATCs: U.S. producers' export shipments, by types, 1987-89, January-September 1989, and January-September 1990

\*                      \*                      \*                      \*                      \*                      \*

U.S. producers' exports of Peltier-effect GATCs increased from \*\*\* units in 1988 to \*\*\* units valued at \$\*\*\* in 1989 and further rose by \*\*\* percent, both by quantity and by value, from January-September 1989 to January-September 1990. U.S. producers' exports of vapor-compression GATCs \*\*\* from 1988 to 1989, and \*\*\* from January-September 1989 to January-September 1990, both by quantity and by value.

Total exports of the three types of GATCs rose \*\*\* from 1988 to 1989 and further increased by \*\*\* from January-September 1989 to January-September 1990.

The overall trends in export unit values paralleled those of U.S. shipments.

#### U.S. producers' inventories

\*                      \*                      \*                      \*                      \*                      \*

#### U.S. employment, wages, and productivity

Trends in the number of production and related workers (table 6) paralleled the upward trends in production and shipments of GATCs. The number of workers producing Peltier-effect GATCs increased \*\*\* from 1988 to 1989, and \*\*\* from January-September 1989 to January-September 1990. Hours worked,

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<sup>30</sup> \*\*\*.

Table 6

Average number of production and related workers producing GATCs, hours worked, wages paid, average hourly wages, total compensation paid, average hourly compensation, productivity, and unit labor costs, by types, 1987-89, January-September 1989, and January-September 1990

\*                      \*                      \*                      \*                      \*                      \*

wages, and total compensation paid to these workers rose accordingly. However, hourly wages and hourly total compensation paid to such workers declined by \*\*\* percent and \*\*\* percent, respectively, from 1988 to 1989. This decrease is due to \*\*\*. Hourly wages and hourly total compensation paid to all workers producing Peltier-effect GATCs rose by \*\*\* percent from January-September 1989 to January-September 1990.

The trends in reported employment indicators for workers producing all GATCs were identical to those for the Peltier-effect GATCs, except that \*\*\*.

#### Financial experience of U.S. producers

Four U.S. producers---\*\*\*<sup>31</sup>--accounting for about \*\*\* percent of production of all GATCs in January-September 1990, provided income-and-loss data on their GATCs and on their establishment operations. \*\*\* did not supply its financial data.

Overall establishment operations---\*\*\* started production of GATCs in \*\*\* and in \*\*\*, respectively. Their data are the same for overall establishment operations and for GATC operations, as they produce only GATCs in their establishments. \*\*\*. The overall establishment income-and-loss data for \*\*\* are presented in table 7.

Operations on Peltier-effect GATCs---MJ Research and Coy Corp. produce \*\*\* Peltier-effect GATCs and/or subassemblies thereof. Their combined income-and-loss data are shown in table 8. \*\*\*. Net sales of GATCs jumped from \$\*\*\* in 1988 to \$\*\*\* in 1989 for the two producers combined. Such sales rose by about \*\*\* percent from \$\*\*\* in January-September 1989 (\*\*\*), to \$\*\*\* in the corresponding period of 1990.

The gross profit margin for the two firms' operations on GATCs and subassemblies thereof averaged around \*\*\* percent during each year and period. However, as a share of net sales, general, selling, and administrative expenses (GS&A) \*\*\* from \*\*\* percent in January-September 1989 to \*\*\* percent in the corresponding period of 1990, resulting in \*\*\*.

The key financial data for each firm are presented in the following tabulation:

\*                      \*                      \*                      \*                      \*                      \*

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<sup>31</sup> \*\*\*.

Table 7

Income-and-loss experience of U.S. producers on the overall operations of their establishments within which GATCs and subassemblies thereof are produced, accounting years 1987-89, January-September 1989, and January-September 1990

Item	1987	1988	1989	Jan.-Sept.--	
				1989	1990
Value (1,000 dollars)					
Net sales . . . . .	***	***	***	***	***
Cost of goods sold . . . . .	***	***	***	***	***
Gross profit . . . . .	***	***	***	***	***
General, selling, and administrative expenses . . . . .	***	***	***	***	***
Operating income or (loss) . . . . .	***	***	***	***	***
Shutdown expenses . . . . .	***	***	***	***	***
Interest expense . . . . .	***	***	***	***	***
Other income or (loss), net . . . . .	***	***	***	***	***
Net income or (loss) before income taxes . . . . .	***	***	***	***	***
Depreciation and amorti- zation included above . . . . .	***	***	***	***	***
Cash flow . . . . .	***	***	***	***	***
Share of net sales (percent)					
Cost of goods sold . . . . .	***	***	***	***	***
Gross profit . . . . .	***	***	***	***	***
General, selling, and administrative expenses . . . . .	***	***	***	***	***
Operating income or (loss) . . . . .	***	***	***	***	***
Net income or (loss) before income taxes . . . . .	***	***	***	***	***
Number of firms reporting					
Operating losses . . . . .	***	***	***	***	***
Net losses . . . . .	***	***	***	***	***
Data . . . . .	***	***	***	***	***

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

Table 8

Income-and-loss experience of U.S. producers on their Peltier-effect GATCs and subassemblies thereof operations, accounting years 1987-89, January-September 1989, and January-September 1990

\* \* \* \* \*

Operations on heat-only GATCs.--\*\*\* produce only heat-only GATCs. Their combined income-and-loss data are presented in table 9. \*\*\*.

Table 9

Income-and-loss experience of U.S. producers on their heat-only GATCs and subassemblies thereof operations, accounting years 1987-89, January-September 1989, and January-September 1990

\* \* \* \* \*

Net sales of heat-only GATCs \*\*\* from \$\*\*\* in 1989 to \$\*\*\* during January-September 1990. \*\*\* reported \*\*\* of \$\*\*\* on sales of \*\*\* GATCs in the first nine months of 1989, but \*\*\* in full-year 1989 when it sold \*\*\* units; in January-September 1990, the company \*\*\* \$\*\*\*, or \*\*\* percent, on sales of \*\*\* units valued at \$\*\*\*. \*\*\* of \$\*\*\*, or \*\*\* percent of net sales, on the sale of \*\*\* units valued at \$\*\*\* in the first nine months of its GATC operations in 1990.

Operations on Peltier-effect and heat-only GATCs combined.--The financial data of Peltier-effect and heat-only GATC operations combined are presented in table 10. The trends for net sales, gross profit, operating income, and pre-tax net income margins generally remained the same as those shown by the Peltier-effect GATC operations discussed above.

Table 10

Income-and-loss experience of U.S. producers on their Peltier-effect and heat-only GATCs and subassemblies thereof operations, accounting years 1987-89, January-September 1989, and January-September 1990

\* \* \* \* \*

Investment in productive facilities.--The value of property, plant, and equipment and total assets of the reporting firms are presented in table 11. The return on book value of fixed assets and the return on total assets are also shown in the table. Operating and net returns on the book value of fixed assets and on total assets followed generally the same trend as did the ratios of operating and net income to net sales during the reporting periods. \*\*\*.

Table 11

GATCs: Value of property, plant, and equipment of U.S. producers, accounting years 1987-89, January-September 1989, and January-September 1990

\* \* \* \* \*

Capital expenditures--The capital expenditures incurred by the reporting firms are shown in the following tabulation (in thousands of dollars):

\* \* \* \* \*

Research and development expenses--Research and development expenses reported by the responding firms are shown in the following tabulation (in thousands of dollars):

\* \* \* \* \*

The majority of research and development expenses for Peltier-effect GATCs were incurred by \*\*\*, whereas for heat-only GATCs such expenses were reported \*\*\*.

Impact of imports on capital and investment--The Commission requested each producer to describe any actual and/or potential negative effects of imports of Peltier-effect in vitro GATCs from the United Kingdom on its growth, investment, ability to raise capital, or existing development and production efforts (including efforts to develop a derivative or improved version of its products). Responses are presented in appendix C.

#### 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<sup>32</sup>--

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<sup>32</sup> 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."

(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,

(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,

(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,

(IX) in any investigation under this title which involves imports of both a raw agricultural product (within the meaning of paragraph (4)(E)(iv)) and any product processed from such raw agricultural product, the likelihood that there will be increased imports, by reason of product shifting, if there is an affirmative determination by the Commission under section 705(b)(1) or 735(b)(1) with respect to either the raw agricultural product or the processed agricultural product (but not both), and

(X) the actual and potential negative effects on the existing development and production efforts of the domestic industry, including efforts to develop a derivative or more advanced version of the like product.<sup>33</sup>

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 imports of the subject merchandise and the alleged material injury or threat thereof;" and information on the effects of imports of the subject merchandise on U.S. producers' existing development and production efforts (item (X)) is presented in the section entitled "Consideration of alleged material injury." Items (I) and (IX) above are not applicable to this investigation. Available information on U.S. inventories of the subject products (item (V)); foreign producers' operations, including the potential for "product-shifting" (items (II), (VI), and (VIII) above); and any other threat indicators, if applicable (item (VII) above), follows.

#### U.S. inventories

USA/Scientific Plastics reported that its end-of-period inventories of Peltier-effect GATCs \*\*\* consisted of \*\*\* units as of September 30, 1990. In addition, there were approximately \*\*\* units \*\*\*; since September 30, 1990, approximately \*\*\* of these units have been \*\*\*. \*\*\*, the other importer of Peltier-effect GATCs, reported \*\*\* inventories.

Importers of heat-only GATCs reported the following inventories: \*\*\*.

#### Ability of foreign producers to generate exports and the availability of export markets other than the United States

Commission staff identified two British producers of Peltier-effect GATCs. LEP Scientific, Ltd., named in the petition, is the \*\*\* exporter of this product from the United Kingdom to the United States.

The Commission requested that counsel representing LEP Scientific, Ltd. in the investigation provide information on the company's Peltier-effect GATC operations in the United Kingdom.<sup>34</sup> The information requested consisted of production, inventories, capacity, home-market shipments, and exports to the

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<sup>33</sup> Section 771(7)(F)(iii) of the act (19 U.S.C. § 1677(7)(F)(iii)) further provides that, in antidumping investigations, ". . . the Commission shall consider whether dumping in the markets of foreign countries (as evidenced by dumping findings or antidumping remedies in other GATT member markets against the same class or kind of merchandise manufactured or exported by the same party as under investigation) suggests a threat of material injury to the domestic industry."

<sup>34</sup> A request for data on the Peltier-effect GATC industry in the United Kingdom was also made of the U.S. embassy in London. No response has been received to date.

United States and all other countries, for each of the periods covered by the investigation. The request also asked for projections for these same factors for 1990 and 1991. Table 12 presents the data received.

Table 12

Peltier-effect GATCs: LEP Scientific Ltd.'s capacity, production, end-of-period inventories, and shipments, 1989, January-September 1989, January-September 1990, and projections for 1990 and 1991

\* \* \* \* \*

LEP's reported production capacity for Peltier-effect GATCs \*\*\* from January-September 1989 to January-September 1990, from \*\*\* units in 1989 to \*\*\* units in 1990.

During January-September 1990, the United States absorbed \*\*\* percent of LEP's total shipments of Peltier-effect GATCs. Other export markets comprised \*\*\* percent, while the home market accounted for \*\*\* percent. \*\*\*, not named in the petition, sold \*\*\* units in the United States during the period of investigation.

\*\*\* estimates that its ratio of home-market shipments to total shipments will \*\*\* from 1990 to 1991. The company projects that its exports to other than the United States will \*\*\*, and that its exports to the United States will \*\*\* from 1990 to 1991. LEP estimates it will market \*\*\* percent of its total shipments in the United States in 1990 and \*\*\* percent in 1991.

Since October 1, 1990, \*\*\*, the only other U.S. importer of Peltier-effect GATCs, has sold an estimated \*\*\* units in the United States. The company projects it will sell \*\*\* units in the United States in 1991.<sup>35</sup>

There is no evidence of the existence of any dumping findings or antidumping remedies in GATT-member countries on Peltier-effect GATCs from the United Kingdom.

There are no known foreign producers of vapor-compression GATCs and three known British producers of heat-only GATCs that export to the United States: \*\*\*.

\* \* \* \* \*

World GATC production is concentrated in the United States and the United Kingdom. Foreign producers of GATCs that do not export to the United States include three German companies (Biometra, Biomed Theres, and Landgraf) and Pharmacia, a Swedish firm.

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<sup>35</sup> \*\*\*.



Consideration of the Causal Relationship Between Imports of the Subject  
Merchandise and the Alleged Material Injury or Threat Thereof

U.S. imports

Table 13 presents imports of Peltier-effect GATCs, by quantity, from the United Kingdom. Such imports, which began in mid-April 1990, amounted to \*\*\* units, valued at \$\*\*\* (with a unit value of \$\*\*\*), through September 1990. Of the \*\*\* units imported, \*\*\* were by USA/Scientific Plastics and \*\*\* were by \*\*\*.

Table 13

GATCs: U.S. imports from the United Kingdom, by types, 1987-89, January-September 1989, and January-September 1990

\* \* \* \* \*

USA/Scientific Plastics received its first imports of Peltier-effect GATCs for commercial sale in \*\*\* 1990. \*\*\*.

In addition to its imports of Peltier-effect GATCs for consumption, USA/Scientific Plastics \*\*\*; these units were delivered directly to \*\*\*. In November 1990, USA/Scientific Plastics imported \*\*\* of the units from \*\*\*. The remaining \*\*\* units \*\*\*; USA/Scientific Plastics has neither \*\*\*.

Imports of heat-only GATCs began in 1988 and rose from \*\*\* units in 1988 to \*\*\* units in 1989. Imports \*\*\* from January-September 1989 to the comparable period of 1990. This was due to \*\*\*. Importers' U.S. shipments of GATCs from the United Kingdom are presented in table 14.

Table 14

GATCs: Importers' U.S. shipments of GATCs imported from the United Kingdom, by types, 1987-89, January-September 1989, and January-September 1990

\* \* \* \* \*

Market penetration by the subject imports

Table 15 details the market penetration of GATCs accounted for by U.S. producers and by the subject imports from the United Kingdom.

Table 15

GATCs: U.S. producers' U.S. shipments, U.S. importers' shipments, apparent U.S. consumption, and market penetration, by types, 1987-89, January-September 1989, and January-September 1990

\* \* \* \* \*

In January-September 1990, the only period for which there were U.S. imports of Peltier-effect GATCs from the United Kingdom, the subject imports accounted for \*\*\* percent, by quantity, of apparent U.S. consumption of Peltier-effect GATCs, \*\*\* percent of apparent U.S. consumption of Peltier-effect GATCs plus vapor-compression GATCs, and \*\*\* percent of the apparent U.S. consumption of all GATCs. Measured by value, the subject imports accounted for \*\*\* percent of apparent U.S. consumption of Peltier-effect GATCs, \*\*\* percent of apparent U.S. consumption of Peltier-effect GATCs plus vapor-compression GATCs, and \*\*\* percent of the apparent U.S. consumption of all GATCs.

#### Other factors influencing the health of the domestic industry

Much material on the record and discussion at the conference has dealt with the troubled relationship between the petitioner, MJ Research, and the respondent, USA/Scientific Plastics, a former distributor of the petitioner's. As Richard E. McDonald, Vice President of USA/Scientific Plastics, expressed at the conference: "... [the] petition is motivated by sour grapes. . ."<sup>36</sup>

USA/Scientific maintains that it began to import the LEP product because there were delivery and reliability problems with the MJ Research product.<sup>37</sup> A summary of the arguments presented on both sides follows:

(1) Delivery schedules--USA/Scientific Plastics alleges that, while selling the product supplied by the petitioner under a non-exclusive distribution agreement, deliveries by MJ Research never met the sales volume, and fell further behind during the entire period, resulting in substantial numbers of sales and order cancellations.<sup>38</sup>

MJ Research reports that its product has been \*\*\*. MJ Research \*\*\*.<sup>39</sup>

According to MJ Research, \*\*\*.<sup>40</sup>

\* \* \* \* \*

(2) Faulty equipment--The respondents allege that an unusually high proportion of MJ Research's machines were defective.<sup>41</sup> The material on the record in this matter is \*\*\*.

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<sup>36</sup> Conference transcript, p. 109.

<sup>37</sup> Respondent's post-conference brief, pp. 31-38; Conference transcript, pp. 113-132.

<sup>38</sup> \*\*\*, conference, and telephone conversations with USA/Scientific Plastics.

<sup>39</sup> Petitioner's post-conference brief, p. 6.

<sup>40</sup> Fieldwork of Nov. 28, 1990; Petitioner's post-conference brief.

<sup>41</sup> Respondent's post-conference brief, pp. 33-35.

MJ Research reports that \*\*\*.<sup>42</sup> MJ Research claims that USA/Scientific's sales force was inexperienced in assisting customers in product installation and repairs and that \*\*\*.

\* \* \* \* \*

However, no information was received from other producers for purposes of comparison.

Additional information has been received from MJ Research concerning the \*\*\* its GATCs prior to \*\*\*. It is true that MJ Research experienced \*\*\*. However, \*\*\*. The last GATCs shipped by MJ Research \*\*\*.

Another \*\*\*.

#### Prices and marketing practices

Demand for GATCs depends on molecular genetic research using the in vitro gene amplification technique. Through this technique, the thermal cycler provides an automated procedure to amplify DNA in a short time, allowing closer analysis by researchers. Demand for these machines has increased dramatically as this technique has become accepted as a standard laboratory procedure in the scientific community. Industry sources have reported that they anticipate demand will continue to expand as the technique moves from university and hospital research laboratories to clinical laboratories.

All U.S. producers and importers agreed that the three types of in vitro GATCs compete to some degree in the marketplace.<sup>43</sup> However, the petitioner, MJ Research, and the respondent, USA/Scientific Plastics, disagreed on the level of competition. MJ Research estimates that vapor-compression GATCs compete with Peltier-effect GATCs in roughly 60 to 70 percent of their uses, whereas heat-only GATCs compete with Peltier-effect GATCs in approximately 35 to 40 percent of their uses.<sup>44</sup> The respondent, USA/Scientific Plastics, argued that its field experience in selling both the domestic and imported product indicates vapor-compression GATCs compete with Peltier-effect GATCs over 90 percent of the time, whereas heat-only GATCs compete with Peltier-effect GATCs 75 percent of the time.<sup>45</sup>

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<sup>42</sup> Petitioner's post-conference brief, p. 8.

<sup>43</sup> See section of this report entitled "The products" for a description of the three machines and their differences.

<sup>44</sup> Conference transcript, p. 92.

<sup>45</sup> Conference transcript, p. 164. USA/Scientific Plastics also submitted a list of \*\*\* sales of either MJ Research's or LEP's GATCs that were allegedly lost to competitive thermal cyclers. Of the \*\*\* instances where USA/Scientific Plastics could identify the winning supplier, \*\*\* purchased Perkin-Elmer's vapor-compression GATCs, \*\*\* purchased heat-only GATCs, and \*\*\* purchased Peltier-effect GATCs.

\*\*\* reported that all types of GATCs currently compete against one another, but that the superior quality of the Peltier-effect technology will eventually differentiate itself from the other types of GATCs.<sup>46</sup> \*\*\* agreed that this differentiation will grow as knowledge increases in the scientific community.

The different types of GATCs have price structures that may be related to the market perception of each firm's product as well as to either the production cost or real features of the machine. Vapor-compression GATCs are more expensive than Peltier-effect GATCs, and Peltier-effect GATCs are generally more expensive than heat-only GATCs. The high price charged by Perkin-Elmer Cetus for its vapor-compression machine incorporates, among other factors, the superior name recognition of the company and its service to end users as well as recognition derived from its patents in this industry. Prices for GATCs also reflect the specific channel of distribution (distributor/dealer or end user), any additional options or accessories included in the sale, and in some cases may reflect discounts granted for purchases of more than a single machine.

U.S. producers and importers publish and generally follow price lists. Distributors generally pay producers between approximately \*\*\* percent to \*\*\* percent of list price, but end users are typically charged the full list price whether purchasing directly from the producer or through a distributor. \*\*\*.<sup>47</sup> Of the \*\*\* of Peltier-effect GATCs, \*\*\*, \*\*\*. U.S. producers and importers of other types of GATCs reported discount programs based on volume or purchasing source, e.g., government or educational purchasers. \*\*\*.<sup>48</sup>

Prices for GATCs are quoted f.o.b. warehouse and the purchasers generally pay for transportation. U.S. producers and importers report that these transportation costs are minor, generally less than 2 percent of the delivered price. Sales terms are typically net 30 days, although one producer \*\*\*.

U.S. producers and importers of all types of GATCs reported order lead times ranging between 3 days and 10 weeks. U.S. producers of Peltier-effect GATCs reported lead times between \*\*\*, whereas U.S. importers of Peltier-effect GATCs reported lead times between \*\*\*.<sup>49</sup> <sup>50</sup> Perkin-Elmer Cetus reported order lead times of \*\*\* for vapor-compression GATCs, while U.S. producers and importers of heat-only GATCs reported lead times between \*\*\*.

USA/Scientific Plastics has argued that any injury suffered by the petitioner was caused by delivery problems and that these problems also led USA/Scientific Plastics to terminate its distributor relationship with MJ Research.<sup>51</sup> MJ Research stated that while its order lead times were long

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<sup>46</sup> \*\*\*.

<sup>47</sup> However, MJ Research reported that sales of these quantities are not common.

<sup>48</sup> Perkin-Elmer Cetus' sales brochure, Spring 1990.

<sup>49</sup> \*\*\*. \*\*\* reported its first U.S. sale of a GATC in \*\*\*.

<sup>50</sup> One reason for the \*\*\* lead times by importers is their \*\*\*. In addition, USA/Scientific Plastics reported that \*\*\*.

<sup>51</sup> \*\*\*.

during the start-up phase of this product, its experience was not different from the experience of other GATC manufacturers. Moreover, it contends that \*\*\*.<sup>52</sup>

MJ Research reported that its lead times have recently improved, but were \*\*\*. MJ Research quoted lead times of \*\*\*.<sup>53</sup> Currently, MJ Research quotes lead times of \*\*\*.

Price data.--The Commission requested U.S. producers and importers of GATCs to provide monthly net U.S. f.o.b. price data from January 1989 through September 1990 for all types of GATCs. U.S. producers and importers were requested to report their lowest price sale and their average price sale of each type of GATC.

Five U.S. producers and six importers of GATCs provided usable data for lowest price and average price sales, but not necessarily for each thermal cyclers type or for each month of the subject period.<sup>54</sup> The responding U.S. producers and importers accounted for about \*\*\* percent of total reported domestic shipments of U.S.-produced GATCs and nearly all of imported GATCs during January-September 1990.<sup>55</sup> Perkin-Elmer Cetus accounted for \*\*\* percent of U.S.-produced shipments of vapor-compression GATCs and over \*\*\* percent of all U.S.-produced shipments of all types of GATCs during January-September 1990. The petitioner, MJ Research, accounted for approximately \*\*\* percent of U.S.-produced shipments of Peltier-effect GATCs during January-September 1990. USA/Scientific Plastics accounted for over \*\*\* percent of all U.S. shipments of the imported British Peltier-effect GATCs and approximately \*\*\* percent of U.S. shipments of all types of GATCs (imported and domestic) during January-September 1990.

Price trends for Peltier-effect GATCs.--In general, prices for both U.S.-produced and imported Peltier-effect GATCs stayed relatively stable throughout the period examined (table 16). The lowest price and the average price were similar in most cases, indicating that most producers and importers offered one price to nearly all customers during each period.

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<sup>52</sup> \*\*\*.

<sup>53</sup> For March 1990 it quoted lead times of \*\*\* weeks.

<sup>54</sup> Two U.S. producers (MJ Research and Coy Corp.) and two importers (USA/Scientific Plastics and \*\*\*) provided pricing information on Peltier-effect GATCs. One U.S. producer (Perkin-Elmer Cetus) provided pricing information on vapor-compression GATCs. Two U.S. producers (BioTherm and Precision Scientific) and four importers (\*\*\*) provided pricing information on heat-only GATCs.

<sup>55</sup> The responding U.S. producers and importers accounted for \*\*\* the known sales of Peltier-effect and vapor-compression GATCs and \*\*\* percent of heat-only thermal cyclers during January-September 1990.

Table 16

Peltier-effect GATCs: Weighted-average net f.o.b. lowest selling prices and average selling prices for the U.S.-produced and imported products from the United Kingdom, by companies, by distribution channels, and by months, January 1989-September 1990

\* \* \* \* \*

U.S. producers' combined weighted-average prices for the Peltier-effect GATC \*\*\* during the entire period \*\*\*. The fluctuation in price was due mainly to the different sales volume between the two producers and their products. \*\*\*.

\* \* \* \* \*

Price trends for other types of GATCs.--During the period of investigation, \*\*\* (table 17). \*\*\*.<sup>56</sup>

Table 17

Vapor-compression GATCs: Net f.o.b. lowest selling prices and average selling prices to end users for the U.S.-produced product, by months, January 1989-September 1990

\* \* \* \* \*

The lowest prices reported for U.S.-produced heat-only GATCs \*\*\* (table 18).

\* \* \* \* \*

Table 18

Heat-only GATCs: Weighted-average net f.o.b. lowest selling prices and average selling prices for the U.S.-produced and imported products from the United Kingdom, by distribution channels, by companies, and by months, January 1989-September 1990

\* \* \* \* \*

Price comparisons for Peltier-type GATCs.<sup>57</sup>--The reported sales information for U.S. producers' and importers' monthly weighted-average

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<sup>56</sup> Perkin-Elmer Cetus provided only \*\*\* prices for its vapor-compression GATC to the Commission during the period of investigation and gave no explanation for the \*\*\*.

<sup>57</sup> Price comparisons were only made between the U.S.-produced and imported Peltier-effect GATCs from the United Kingdom because of both being similar technologies.

lowest-price shipments of Peltier-effect GATCs to end users during January 1989-September 1990 resulted in \*\*\* direct price comparisons (table 19).

Table 19

Peltier-effect GATCs: Average margins of underselling (overselling) by imports from the United Kingdom sold to end users, by months, January 1989-September 1990

\* \* \* \* \*

#### Exchange rates

Quarterly data reported by the International Monetary Fund indicate that during January 1987-September 1990 the value of the British pound fluctuated, appreciating 20.7 percent overall relative to the U.S. dollar (table 20).<sup>58</sup> Adjusted for movements in producer price indexes in the United States and the United Kingdom, the real value of the British currency showed an overall appreciation of 12.5 percent for the period January 1987 through the second quarter of 1990, the most recent period for which official price data are available.

#### Lost sales/lost revenues

\*\*\* specific allegations of lost sales were reported to the Commission by the petitioner, MJ Research.<sup>59</sup> These allegations involved \*\*\* GATCs sold \*\*\* to \*\*\* different purchasers during the period \*\*\*. MJ Research alleged lost sales of \$\*\*\* as each of the \*\*\* purchasers cancelled their original order. Each GATC was priced at \$\*\*\* to \*\*\*.<sup>60</sup> The Commission staff contacted all purchasers cited.<sup>61</sup>

\*\*\* purchasers acknowledged cancelling the purchase of the MJ Research machine. \*\*\* purchasers reported that they cancelled these orders due to delivery problems of the manufacturer, MJ Research.<sup>62</sup> These purchasers cited manufacturer lead times and backorders of \*\*\* as the main reason for cancelling the orders. \*\*\* bought the imported British Peltier-effect GATC, \*\*\* bought \*\*\* heat-only GATC, and \*\*\* bought a Perkin-Elmer Cetus vapor-compression GATC.<sup>63</sup>

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<sup>58</sup> International Financial Statistics, November 1990.

<sup>59</sup> \*\*\*.

<sup>60</sup> In each of these lost sales allegations, MJ Research could only provide to the Commission \*\*\*.

<sup>61</sup> \*\*\* reported that they had lost sales due to imports but were unable to cite specific examples. \*\*\* reported that any sale to any other manufacturer was a lost sale. \*\*\* stated that \*\*\* did not consider the importers to be currently a major competitor in the marketplace. \*\*\*.

<sup>62</sup> The \*\*\* purchasers are: \*\*\*.

<sup>63</sup> \*\*\*.

Table 20

Exchange rates:<sup>1</sup> Indexes of nominal and real exchange rates of the British pound, and indexes of producer prices in the United States and the United Kingdom,<sup>2</sup> by quarters, January 1987-September 1990

Period	U.S. producer price index	British producer price index	Nominal exchange rate index	Real exchange rate index <sup>3</sup>
1987:				
January-March.....	100.0	100.0	100.0	100.0
April-June.....	101.6	101.0	106.6	105.9
July-September.....	102.8	101.6	104.9	103.7
October-December....	103.3	102.7	113.8	113.2
1988:				
January-March.....	103.9	103.8	116.5	116.5
April-June.....	105.5	105.3	119.5	119.3
July-September.....	107.1	106.5	110.0	109.5
October-December....	107.6	107.8	116.1	116.3
1989:				
January-March.....	109.9	109.3	113.4	112.7
April-June.....	111.9	110.6	105.6	104.4
July-September.....	111.5	112.0	103.6	104.1
October-December....	111.9	113.4	102.8	104.2
1990:				
January-March.....	113.5	115.2	107.5	109.1
April-June.....	113.2	117.2 <sup>4</sup>	108.6	112.5 <sup>4</sup>
July-September.....	115.3	( <sup>5</sup> )	120.7	( <sup>5</sup> )

<sup>1</sup> Exchange rates expressed in U.S. dollars per British pound.

<sup>2</sup> Producer price indexes--intended to measure final product prices--are based on period-average quarterly indexes presented in line 63 of the International Financial Statistics.

<sup>3</sup> The real exchange rate is derived from the nominal rate adjusted for relative movements in producer prices in the United States and the United Kingdom.

<sup>4</sup> Derived from price data reported for April-May only.

<sup>5</sup> Not available.

Note.--January-March 1987 = 100.

Source: International Monetary Fund, International Financial Statistics, November 1990.



\*\*\* purchasers reported that they cancelled the MJ Research GATC after \*\*\*. \*\*\* bought the imported British Peltier-effect GATC from \*\*\*, and \*\*\* bought a Perkin-Elmer Cetus vapor-compression GATC.

\*\*\* who bought the imported British Peltier-effect GATC reported that the availability of the GATC and not price was the main factor in their decision to purchase the British product. These purchasers reported that they paid \*\*\* for the imported product quoted to them by \*\*\*. These purchasers received the imported British product within \*\*\* of their order. \*\*\*.



APPENDIX A

FEDERAL REGISTER NOTICES

## INTERNATIONAL TRADE COMMISSION

[Investigation No. 731-TA-485 (Preliminary)]

### Certain Gene Amplification Thermal Cyclers and Subassemblies Thereof From the United Kingdom

**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 institution of preliminary antidumping investigation No. 731-TA-485 (Preliminary) under section 733(a) of the Tariff Act of 1930 (19 U.S.C. 1673b(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 from the United Kingdom of certain gene amplification thermal cyclers and subassemblies thereof,<sup>1</sup> provided for in subheadings 8419.89.50 and 8419.90.90, respectively, of the Harmonized Tariff Schedule of the United States, that are alleged to be sold in the United States at less than fair value. As provided in section 733(a), the Commission must complete preliminary antidumping investigations in 45 days, or in this case by December 31, 1990.

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 B (19 CFR part 207), and part 201, subparts A through E (19 CFR part 201).

**EFFECTIVE DATE:** November 14, 1990.

**FOR FURTHER INFORMATION CONTACT:** Janine Wedel (202-252-1178), Office of

<sup>1</sup> For purposes of this investigation, "certain" gene amplification thermal cyclers consist of Peltier-effect in vitro gene amplification thermal cyclers. Gene amplification thermal cyclers are microprocessor-based reaction controllers that regulate temperatures for small quantities of biologic reagents through a programmed and highly controlled thermal regime. They are used in biotechnology applications, including a biological protocol called in vitro gene amplification, as well as in several related sequencing and radionucleotide labeling reactions. Peltier-effect machines use one or more thermoelectric modules for heating and cooling of the biological sample.

The petitioner has identified four subassemblies that are wholly unique to and dedicated to Peltier-effect in vitro gene amplification thermal cyclers: (1) The sample block/thermoelectric/sensor/heat exchanger subassembly; (2) the sheet metal housing; (3) the membrane keypad used to program and control the machine; and (4) the proprietary software.

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 November 14, 1990, by MJ Research, Inc., Watertown, MA.

##### 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.

##### Public Service List

Pursuant to § 201.11(d) of the Commission's rules (19 CFR 201.11(d)), the Secretary will prepare a public 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 public document filed by a party to the investigation must be served on all other parties to the investigation (as identified by the public 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.

##### Limited Disclosure of Business Proprietary Information under a Protective Order and Business Proprietary Information Service List

Pursuant to § 207.7(a) of the Commission's rules (19 CFR 207.7(a)), the Secretary will make available business proprietary information gathered in this preliminary investigation to authorized applicants under a protective order, provided that the application be made not later than seven (7) days after the publication of this notice in the Federal Register. A

separate service list will be maintained by the Secretary for those parties authorized to receive business proprietary information under a protective order. The Secretary will not accept any submission by parties containing business proprietary information without a certificate of service indicating that it has been served on all the parties that are authorized to receive such information under a protective order.

##### Conference

The Director of Operations of the Commission has scheduled a conference in connection with this investigation for 9:30 a.m. on December 5, 1990, at the U.S. International Trade Commission Building, 500 E Street SW., Washington, DC. Parties wishing to participate in the conference should contact Janine Wedel (202-252-1178) not later than November 30, 1990, to arrange for their appearance. Parties in support of the imposition of antidumping duties in this investigation and parties in opposition to the imposition of such duties will each be collectively allocated one hour within which to make an oral presentation at the conference.

##### Written Submissions

Any person may submit to the Commission on or before December 7, 1990, a written brief containing information and arguments pertinent to the subject matter of the investigation, as provided in § 207.15 of the Commission's rules (19 CFR 207.15). If briefs contain business proprietary information, a nonbusiness proprietary version is due December 10, 1990. A signed original and fourteen (14) copies of each submission must be filed with the Secretary to the Commission in accordance with section 201.8 of the rules (19 CFR 201.8). All written submissions except for business proprietary 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 information for which business proprietary treatment is desired must be submitted separately. The envelope and all pages of such submission must be clearly labeled "Business Proprietary Information." Business proprietary submissions and requests for business proprietary treatment must conform with the requirements of §§ 201.6 and 207.7 of the Commission's rules (19 CFR 201.6 and 207.7).

Parties which obtain disclosure of business proprietary information pursuant to § 207.7(a) of the

Commission's rules (19 CFR 207.2(a)); may comment on such information in their written brief, and may also file additional written comments on such information no later than December 12, 1990. Such additional comments must be limited to comments on business proprietary information received in or after the written briefs. A nonbusiness proprietary version of such additional comments is due December 13, 1990.

**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: November 16, 1990.

Kenneth R. Mason,

Secretary.

[FR Doc. 90-27424 Filed 11-19-90; 8:45 am]

BILLING CODE 7020-02-M

Washington, DC 20230; telephone (202) 377-5288.

**SUPPLEMENTARY INFORMATION:**

**The Petition**

On November 14, 1990, we received a petition filed in proper form by M.J. Research, Inc. In compliance with the filing requirements of the Department's regulations (19 CFR 353.12), petitioner alleges that imports of GATCs from the United Kingdom 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 there is a reasonable indication that an industry in the United States is being materially injured, or is threatened with material injury, by reason of imports from the United Kingdom of GATCs.

Petitioner has stated that it has standing to file the petition because it is an interested party, as defined under section 771(9)(C) of the Act, and because it has filed the petition on behalf of the U.S. industry producing 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 for, or opposition to, this petition, please file written notification with the Assistant Secretary for Import Administration.

Under the Department's regulations, any producer or reseller seeking exclusion from a potential antidumping duty order must submit its request for exclusion within 30 days of the date of the publication of this notice. The procedures and requirements regarding the filing of such requests are contained in 19 CFR 353.14.

**United States Price and Foreign Market Value**

Petitioner based its estimates of United States price on price quotes from an unrelated distributor to end users. Petitioner made deductions for estimated distributor markup, movement charges, and U.S. duty.

Petitioner based its estimates of foreign market value on a price quote to an unrelated distributor. Petitioner made adjustments for differences in merchandise, packing, and credit. We have recalculated the credit adjustment using the Department's standard methodology.

Based on a comparison of U.S. price and foreign market value, petitioner alleges dumping margins ranging from 50.36 to 59.81 percent. Based on our recalculations, these margins range from 46.21 to 55.15 percent.

Petitioner also alleges that "critical circumstances" exist, within the

meaning of section 733(e) of the Act, with respect to imports of GATCs from the United Kingdom.

**Initiation of Investigation**

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

We have examined the petition and found that it complies with 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 GATCs from the United Kingdom are being, or are likely to be, sold in the United States at less than fair value. If our investigation proceeds normally, we will make our preliminary determination by April 23, 1991.

**Scope of Investigation**

The products covered by this investigation are certain gene amplification thermal cyclers, consisting of Peltier-effect *in vitro* GATCs, whether assembled or unassembled, and the subassemblies thereof specified below. GATCs are microprocessor-based reaction controllers that regulate temperatures of biologic reagents through a programmed and highly controlled thermal regime. GATCs incorporate a metal sample block, one or more thermoelectric modules, one or more electronic thermal sensors, a heat exchanger, power supply circuitry, microprocessor-based logic circuitry, software, and a housing or enclosure. GATCs are used in a variety of biotechnology applications, such as *in vitro* gene amplification, and sequencing and radionucleotide labeling reactions. Peltier-effect machines use one or more thermoelectric modules for cooling the biologic samples, and the thermoelectric modules and/or electric resistive heaters for heating the biologic samples. Excluded from this investigation are vapor compression thermal cyclers, which use a reversed Rankine cycle apparatus, and heat-only thermal cyclers.

The following subassemblies are included in the scope of the investigation when they are manufactured according to specifications and operational requirements for use in a GATC as defined in the preceding paragraph: (a) The sample block/thermoelectric

**International Trade Administration**  
[A-412-806]

**Initiation of Antidumping Duty Investigation: Certain Gene Amplification Thermal Cyclers and Subassemblies Thereof From the United Kingdom**

**AGENCY:** Import Administration, International Trade Administration, Commerce.

**ACTION:** Notice.

**SUMMARY:** On the basis of a petition filed in proper form with the U.S. Department of Commerce (the "Department"), we are initiating an antidumping duty investigation to determine whether imports of certain gene amplification thermal cyclers and subassemblies thereof (GATCs) from the United Kingdom are being, or are likely to be, sold in the United States at less than fair value.

**EFFECTIVE DATE:** December 13, 1990.

**FOR FURTHER INFORMATION CONTACT:** Bradford Ward, Office of Antidumping Investigations, Import Administration, International Trade Administration, U.S. Department of Commerce, 14th Street and Constitution Avenue, NW.,

sensor/heat exchanger subassembly, which consists of the sample block, one or more thermoelectric modules, one or more electronic thermal sensors, and a heat exchanger, and which can include an electric resistive heater; (b) the housing or enclosure, whether finished or unfinished, or the GATC; (c) the membrane keypad used to program and control a GATC; and (d) the software to operate the GATC.

GATCs are currently classifiable under the Harmonized Tariff Schedule (HTS) subheading 8419.89.5075. GATC subassemblies are currently classifiable under HTS subheading 8419.90.9060. The HTS subheadings are provided for convenience and Customs purposes. The written description remains dispositive.

#### **Notification of International Trade Commission**

Section 732(d) of the Act requires us to notify the International Trade Commission (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 non-privileged and non-proprietary information. We will allow the ITC access to all privileged and business proprietary information in the Department's files, provided the ITC confirms in writing that it will not disclose such information either publicly or under administrative protective order, without the written consent of the Deputy Assistant Secretary for Investigations, Import Administration.

#### **Preliminary Determination by ITC**

The ITC determine by December 31, 1990, 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 GATCs from the United Kingdom. If its determination is negative, the investigation will be terminated; otherwise, the investigation will proceed according to the statutory and regulatory time limits.

This notice is published pursuant to section 732(c)(2) of the Act and 19 CFR 353.13(b).

Dated: December 4, 1990.

Marjorie A. Chorlins,  
*Acting Assistant Secretary for Import Administration.*

[FR Doc. 90-29236 Filed 12-12-90; 8:45 am]

BILLING CODE 3510-DS-M





APPENDIX B

LIST OF PARTICIPANTS IN THE PUBLIC CONFERENCE  
IN THIS INVESTIGATION

LIST OF PARTICIPANTS IN THE PUBLIC CONFERENCE

December 5, 1990

Investigation No. 731-TA-485 (Preliminary)

Certain Gene Amplification Thermal Cyclers and Subassemblies Thereof  
from the United Kingdom

Those persons listed below appeared at the United States International Trade Commission's conference held in connection with the subject investigation on December 5, 1990, in Courtroom B (room 111) of the U.S. International Trade Commission building, 500 E Street, SW, Washington, DC.

In support of the imposition of antidumping duties

MJ Research, Inc.  
Watertown, MA

John Finney, President  
John Hansen, Director of Special Projects

In opposition to the imposition of antidumping duties

Howrey & Simon--Counsel  
Washington, DC  
on behalf of--

USA/Scientific Plastics, Inc.

Hugh Prior, President  
Richard McDonald, Vice President  
Niki Faldemolaei, Product Manager for Equipment  
Eugene Platter, Vice President of Sales and Marketing

LEP Scientific Limited

Gordon Saunders, Managing Director  
Ken W. Lambert, Commercial Director, LEP Industrial Holdings Ltd.

Michael A. Hertzberg) --OF COUNSEL  
Juliana Cofrancesco )

**APPENDIX C**

**COMMENTS RECEIVED FROM U.S. PRODUCERS ON THE IMPACT OF IMPORTS OF  
Peltier-EFFECT GATCs FROM THE UNITED KINGDOM ON THEIR GROWTH,  
INVESTMENT, ABILITY TO RAISE CAPITAL, AND EXISTING  
DEVELOPMENT AND PRODUCTION EFFORTS**

The Commission requested each producer of GATCs to describe any actual and/or potential negative effects of imports of Peltier-effect in vitro GATCs from the United Kingdom on its growth, investment, ability to raise capital, or existing development and production efforts (including efforts to develop a derivative or improved version of its products). The responses received are presented below.

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