

UNITED STATES OF AMERICA  
BEFORE THE FEDERAL TRADE COMMISSION

COMMISSIONERS: Joseph Simons, Chairman  
Maureen Ohlhausen  
Rohit Chopra  
Noah Phillips  
Rebecca Slaughter



In the Matter of

Tronox Limited  
a corporation,

National Industrialization Company  
(TASNEE)  
a corporation,

National Titanium Dioxide Company  
Limited (Cristal)  
a corporation,

And

Cristal USA Inc.  
a corporation.

Docket No. 9377

RESPONDENTS' PRE-TRIAL BRIEF

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**INTRODUCTION**

U.S.-based Tronox Limited's ("Tronox") acquisition of the Saudi Arabia-based National Titanium Dioxide Company ("Cristal") will create a vertically-integrated, global titanium dioxide ("TiO<sub>2</sub>") producer with lower marginal costs and expanded TiO<sub>2</sub> output. These results are not hypothetical; they are the prime motivation behind the transaction. The transaction will match Tronox's long position on feedstock to Cristal's short position, yielding a combined company that can better supply its own pigment facilities without turning to the feedstock market, where producers incur marginal costs and are exposed to the risk of feedstock shortages. The transaction will also expand output at Cristal facilities: Tronox will be uniquely able to rehabilitate Cristal's underperforming Yanbu (Saudi Arabia) pigment plant, which runs on the same technology, developed by Tronox's predecessor Kerr-McGee, as Tronox's high-performing Hamilton (Mississippi) facility, and Tronox will apply its proven track record of increasing plant efficiencies to improve output at other Cristal facilities without imposing additional fixed costs. The transaction will realize additional synergies by reducing general, selling, and administrative costs in the combined company. For all of these reasons, the transaction is necessarily pro-competitive. Reducing marginal costs and enhancing output will mean lower prices for TiO<sub>2</sub> customers.

In challenging this transaction, Complaint Counsel bears the burden of (1) properly defining the relevant product and geographic market, (2) showing that the transaction will lead to undue concentration in that market, and (3) demonstrating that anticompetitive effects are a likely outcome of the transaction. Complaint Counsel cannot meet this burden.

Complaint Counsel begins by improperly defining the relevant market as only sales of TiO<sub>2</sub> produced by the chloride process in the United States and Canada. That proposed market is wrong as a matter of geography because TiO<sub>2</sub> trade flows move globally, with product imported

and exported to and from every region of the world. Specifically, TiO<sub>2</sub> customers in the U.S. and Canada are supplied significantly by imports, and prices in those countries are co-integrated with global prices, indicating a global market. Statistical analysis confirms that Complaint Counsel's proposed U.S./Canada market fails Complaint Counsel's own test for determining whether a market is properly defined: if a hypothetical monopolist tried to impose a small but significant, non-transitory increase in price ("SSNIP") for TiO<sub>2</sub> in the U.S. and Canada, TiO<sub>2</sub> producers from other regions of the world would send product to that market, rendering the price increase unprofitable.

Complaint Counsel's chloride-only product market is improperly defined, too. All rutile TiO<sub>2</sub>, whether produced by the chloride or the sulfate process, is interchangeable in the vast majority of applications. As a result, prices of chloride- and sulfate-produced TiO<sub>2</sub> are co-integrated, showing that they trade in a single market. And here again, Complaint Counsel's proposed chloride-only market fails Complaint Counsel's own hypothetical monopolist test, because the market response from sulfate-process TiO<sub>2</sub> producers would render any SSNIP unprofitable.

In a properly defined geographic and product market (the global market for all rutile TiO<sub>2</sub>), post-transaction market concentration would be too low to pose a threat to competition. Complaint Counsel is able to show concentration numbers capable of threatening competition only by adopting its gerrymandered, chloride-only, sales to U.S./Canada market definition. Indeed, it seems Complaint Counsel's view of the relevant TiO<sub>2</sub> market is good for one use only: in reviewing previous proposed transactions in the TiO<sub>2</sub> industry, the Commission has forecast anticompetitive effects based on defining the TiO<sub>2</sub> market as *a single, global market for both chloride- and sulfate-produced TiO<sub>2</sub>*. The European Commission has likewise adopted the view

in investigations that the TiO<sub>2</sub> market is a single, global market for all rutile TiO<sub>2</sub>, whether produced by the chloride or the sulfate process. Complaint Counsel's proposed market is results-driven and does not correspond to reality.

Even if Complaint Counsel's proposed market were properly defined, this transaction would still be pro-competitive because, as described, it will expand TiO<sub>2</sub> output and deliver verifiable, substantial, transaction-specific synergies. Additionally, Chinese TiO<sub>2</sub> producers are powerful new market entrants who are rapidly gaining shares of North American TiO<sub>2</sub> sales, changing the competitive makeup of the market and decreasing concentration.

Complaint Counsel nevertheless purports to show that competitive effects are likely post-transaction in the form of unilateral output reductions or coordinated effects, but the evidence cannot support Complaint Counsel's claims. Profitability in the TiO<sub>2</sub> industry depends on running production facilities full-out, maximizing output to reduce marginal fixed costs. Complaint Counsel's examples of past output reductions in the industry did not cause price increases and were never intended to do so: these were rational business decisions responding to dire economic conditions. Furthermore, economic modeling confirms that the combined company could not profitably decrease output unilaterally because of the natural response of competitors. To be sure, Complaint Counsel's economic expert purports to show otherwise, but Dr. Nicholas Hill's calculations adopt unjustifiable assumptions that bias his simulation toward predicting unilateral output reduction. When those unjustifiable assumptions are replaced with assumptions that reflect reality, Dr. Hill's own model shows that small reductions in output will prompt competitive responses that render the reduction unprofitable.

Complaint Counsel claims that coordination already occurs in the TiO<sub>2</sub> industry and that post-transaction coordination is likely, but here again, Complaint Counsel's evidence cannot back

up these claims. In reality, coordination is not possible in the TiO<sub>2</sub> industry because TiO<sub>2</sub> prices are individually negotiated with customers and are subject to fierce competition. Customers hold significant buying power in this industry and have the ability to both leverage producers against one another and hedge against price volatility over time. And Complaint Counsel's reliance on two civil antitrust suits is misleading—the TiO<sub>2</sub> industry does not evidence past coordination. No court has held that coordination exists in the TiO<sub>2</sub> industry. Complaint Counsel relies on excerpts from a summary judgment decision that merely held that the question of the existence of coordination in the TiO<sub>2</sub> industry was unsuitable for summary judgment and could proceed to a jury. *In re Titanium Dioxide Antitrust Litig.*, 959 F. Supp. 2d 799, 823 (D. Md. 2013). In the second case, Complaint Counsel neglects to mention that the Third Circuit actually held that the record was *insufficient* to support the inference that TiO<sub>2</sub> producers were coordinating prices. *Valspar v. E.I. Du Pont De Nemours & Co.*, 873 F.3d 185, 202 (3d Cir. 1997).

In short, Complaint Counsel cannot meet its burden to show that competitive effects are a likely result of this transaction. Complaint Counsel's complaint should be rejected and Tronox's proposed acquisition of Cristal should be allowed to proceed.

## **BACKGROUND**

### **A. TiO<sub>2</sub> Is A Ubiquitous White Powder Pigment With Diverse Applications.**

The transacting parties manufacturer rutile TiO<sub>2</sub>,<sup>1</sup> a ubiquitous white powder pigment used in diverse applications, including paints, plastics, and inks. Customers primarily value TiO<sub>2</sub> for its ability to impart exceptional durability, whiteness, brightness, and opacity to the products in

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<sup>1</sup> About ten percent of the world's total TiO<sub>2</sub> production is anatase TiO<sub>2</sub>, which has a different crystal structure than rutile TiO<sub>2</sub>. Anatase TiO<sub>2</sub> is used in indoor paints, paper, ceramics, rubber, and fiber manufacture. Anatase TiO<sub>2</sub> is not at issue here. Cristal manufacturers anatase TiO<sub>2</sub> while Tronox does not.

which it is used. TiO<sub>2</sub> makes paint cover a wall in a single coat, makes inks render solid text without smearing or fading, and makes plastics appear opaque and consistently colored.

Tronox is a vertically-integrated TiO<sub>2</sub> producer, meaning that Tronox supplies its own feedstock for its pigment manufacturing facilities. All TiO<sub>2</sub> production begins with feedstock, a term for the variety of mineral inputs that contain TiO<sub>2</sub> in concentrations too low to be commercially useful as pigment. Feedstocks vary in their percentage concentration of TiO<sub>2</sub>. There are three naturally-occurring feedstocks: ilmenite (contains 45-65% TiO<sub>2</sub>), leucocoxene (65-90%), and rutile (94-96%). Ilmenite is the most abundant feedstock, although it contains the lowest concentration of TiO<sub>2</sub> and is therefore “low-grade.” Ilmenite can be refined into “high-grade” feedstock containing higher concentrations of TiO<sub>2</sub> through smelting and other processes. These secondary, high-grade feedstocks include titanium slag (produced through smelting) and synthetic rutile.

There are two manufacturing processes for making TiO<sub>2</sub>: the sulfate process and the chloride process. Which process is used has little effect on the end product. TiO<sub>2</sub> produced from the chloride and sulfate processes is interchangeable in at least 80% of applications.<sup>2</sup> As the European Commission (“EC”) recognized in its 2014 decision regarding Huntsman’s (now Venator’s) acquisition of Rockwood Holdings, chloride and sulfate TiO<sub>2</sub> “can be used almost interchangeably in the vast majority of mass applications,” which the EC defined as coatings, plastics, and paper.<sup>3</sup> “[S]egmentation . . . by type of TiO<sub>2</sub> manufacturing process would not appear to be appropriate for any of the mass applications,” in which Tronox and Cristal exclusively compete.<sup>4</sup>

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<sup>2</sup> [REDACTED]

<sup>3</sup> RX0200 (Sept. 10, 2014 European Commission Decision) at ¶ 494.

<sup>4</sup> *Id.* ¶ 496.

Despite producing interchangeable end products, the behind-the-scenes details of each production process differ. The sulfate process is a batch process that uses concentrated sulfuric acid to produce a titanium solution which, following hydrolysis and calcination, produces TiO<sub>2</sub>.<sup>5</sup> The chloride process uses chlorine gas to produce an intermediate material, which is then purified. The chloride process is a continuous, high volume production.<sup>6</sup> The chloride process is generally more environmentally friendly than the sulfate process because it produces less waste material. The sulfate process, however, can accept lower purity feedstock, like ilmenite, while the chloride process requires feedstocks with higher TiO<sub>2</sub> concentrations, like rutile, titanium slag, and synthetic rutile. Global TiO<sub>2</sub> production is nearly evenly split between the sulfate and chloride processes. In 2016, TiO<sub>2</sub> production from chloride plants represented 48% of global production, while TiO<sub>2</sub> production from sulfate plants represented 52% of global production.<sup>7</sup>

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(citing RX1198 (TZMI, "TiO<sub>2</sub> Pigment Supply/Demand," Nov. 2017)).

**B. The Transacting Companies.****1. Tronox, Ltd.**

Tronox, Ltd. is a public company traded on the New York Stock Exchange (TRX). Tronox's corporate headquarters are in Stamford, Connecticut, and it is registered to do business under the laws of Australia. Tronox manufactures pigment at three plants: Hamilton (Mississippi), Kwinana (Australia), and Botlek (The Netherlands). Tronox also conducts mining and other feedstock operations to supply its pigment plants, as follows: at the KwaZulu-Natal Sands operation (South Africa), Tronox mines mineral sands and operates a smelter complex to produce titanium slag; at the Namakwa Sands operation (South Africa), Tronox mines mineral sands and operates a smelter complex to produce titanium slag; and at the Western Australia operation, Tronox mines mineral sands and refines ilmenite to produce synthetic rutile.<sup>8</sup>

Overall, Tronox is long on feedstock. Tronox's mining facilities produce more feedstock than the company's TiO<sub>2</sub> manufacturing facilities can use. As a result, Tronox sells some of its feedstock to other TiO<sub>2</sub> manufacturers. Many manufacturers, however, prefer to source their feedstock from non-competitor suppliers because in the event of shortage, a competitor supplier will prioritize its own needs. As a result, during some time periods, Tronox experiences decreased feedstock demand and is left with unused feedstock capacity.<sup>9</sup>

**2. Cristal, Ltd.**

The National Titanium Dioxide Company Ltd. (hereafter, "Cristal"), is a privately held company registered under the laws of the Kingdom of Saudi Arabia. The National Industrialization Company ("TASNEE") is a joint stock company registered under the laws of the Kingdom of Saudi Arabia. TASNEE owns 79% of Cristal. Cristal USA, Inc. is a wholly owned

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<sup>8</sup>

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subsidiary of Cristal through which Cristal conducts its business activities in the United States. Cristal operates TiO<sub>2</sub> pigment manufacturing facilities on five continents: Ashtabula I (Ohio), Ashtabula II (Ohio), Yanbu (Saudi Arabia), Stallingborough (United Kingdom), Bunbury (Australia), Bahia (Brazil), Tikon (China), and Thann (France). Cristal mines feedstock in Brazil and Australia. Cristal's mines yield very little high-grade feedstock, and what high-grade feedstock they do produce is easily consumed by its pigment manufacturing facilities without satisfying those facilities' needs. The majority of the feedstock Cristal mines is low-grade ilmenite that Cristal's pigment facilities cannot use, and Cristal has no functioning capacity to upgrade that feedstock. As a result, Cristal sells the majority of [REDACTED] [REDACTED].<sup>10</sup> To remedy this persistent feedstock shortfall, Cristal and its parent company built an ilmenite smelter in Saudi Arabia called the Jazan slagger, with the goal of upgrading some of Cristal's own mined ilmenite in-house. After [REDACTED] in investments and multiple failed start-up campaigns, however, the Jazan slagger is not operational and currently upgrades *no* TiO<sub>2</sub> feedstock.<sup>11</sup>

Overall, Cristal is short on feedstock and incurs significant marginal costs purchasing high-grade feedstock on the open market.

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**C. The Transaction.**

Tronox has proposed to acquire Cristal in a \$2.4 billion transaction that will produce significant, output-enhancing, transaction-specific synergies, leading to increased global supply of TiO<sub>2</sub>.

The proposed transaction will produce a vertically-integrated TiO<sub>2</sub> manufacturer capable of supplying most of the feedstock needs for the combined company's pigment manufacturing facilities. The transaction will enable the combined company to use Tronox's pre-transaction net long feedstock position to offset a portion of Cristal's pre-transaction net short feedstock position. While the combined company will initially be short on feedstock, the transaction will incentivize the combined company to increase feedstock production from pre-transaction Tronox assets. Those assets do not always produce feedstock at maximum capacity because sometimes Tronox experiences a decrease in feedstock demand. With the addition of Cristal's pigment manufacturing facilities, the combined company will be incentivized to expand the mining and feedstock-upgrading capacity of Tronox assets without the risk that new capacity will sometimes go unsold. The combined company will always be able to use all of the feedstock it produces. The resulting vertical integration will reduce the combined company's feedstock price risk and will eliminate the marginal costs Cristal currently incurs by [REDACTED]

[REDACTED].<sup>12</sup>

The proposed transaction will lead to other synergies as well. The technology Cristal employs at its Yanbu pigment facility is the same technology Tronox uses at its Hamilton plant. Yanbu currently operates below nameplate capacity, however, while Hamilton operates above it.

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<sup>12</sup> [REDACTED].

By applying Tronox leadership and know-how, the combined company will be able to increase Yanbu's output without expanding the facility or significantly increasing fixed costs.<sup>13</sup> Tronox is also uniquely able to accomplish startup at Cristal's defunct Jazan slagger in Saudi Arabia. Toward that end, Tronox has signed an option agreement with Cristal, contingent on the regulatory approval of this transaction, by the terms of which Tronox has agreed to loan up to \$125 million for capital expenditures and operational expenses needed to facilitate the startup of the Jazan slagger.<sup>14</sup> Additionally, Tronox estimates [REDACTED]

[REDACTED] by implementing Tronox's proven framework of best practices.<sup>15</sup>

[REDACTED]

[REDACTED]<sup>16</sup>

The proposed transaction is pro-competitive because the combined Tronox-Cristal entity will be incentivized to reduce marginal costs and expand output, which will lower prices for customers.

#### **D. The Cyclical TiO2 Industry**

The TiO2 industry is dynamic, competitive, and subject to cyclical pricing. TiO2 price cycles are driven by large volume TiO2 end-users (coatings, paper, and plastics manufacturers), who experience demand volatility in their industries as a result of significant changes in global economic activity.<sup>17</sup> TiO2 producers cannot perfectly predict these downstream demand changes, which cause recurring supply and demand imbalances and lead to price cycles.<sup>18</sup> The existence of

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13 [REDACTED].

14 RX1600 (Tronox Form 8-K (May 10, 2018)).

15 [REDACTED]

16 [REDACTED]

17 [REDACTED]

18 [REDACTED]

cyclical pricing is well recognized in the industry. Price cycles typically last between 18 and 60 months and proceed in phases, with a peak consisting of accelerating price increases and strong sales volumes, and a trough characterized by falling prices as customers with large accumulated inventories purchase less TiO<sub>2</sub>.<sup>19</sup>

Even at the peak of a price cycle, however, margins in the industry are thin.<sup>20</sup> Thin margins are caused by several factors: (1) the commodity nature of TiO<sub>2</sub> in most applications; (2) producers' relatively high fixed costs; and (3) structural impediments that prevent TiO<sub>2</sub> producers from matching supply to demand.<sup>21</sup> High fixed costs place a premium on increasing plant utilization, which is a primary financial goal in the industry.<sup>22</sup> Achieving higher utilization rates dilutes fixed costs and allows producers to reduce prices.<sup>23</sup> Low utilization rates are not economically feasible; raising utilization rates has a significant positive effect on profitability.<sup>24</sup>

As a cyclical industry that suffers deep demand troughs and enjoys thin margins even in the best of times, TiO<sub>2</sub> production is highly competitive.

### LEGAL STANDARD

Section 7 of the Clayton Act prohibits a corporation from acquiring another where “the effect of such acquisition may be substantially to lessen competition, or to tend to create a monopoly.” 15 U.S.C. § 18. In a case challenging a transaction under the Clayton Act, Complaint

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Counsel has the “ultimate burden of proving a Section 7 violation.” *United States v. Sungard Data Sys., Inc.*, 172 F. Supp. 2d 172, 180 (D.D.C. 2001).<sup>25</sup>

Section 7 cases begin by determining the relevant product and geographic markets. *United States v. Oracle Corp.*, 331 F. Supp. 2d 1098, 1110 (N.D. Cal. 2004); *see* 15 U.S.C. § 18 (“in any line of commerce . . . in any section of the country”). This is an essential first step because “only a further examination of the particular market—its structure, history, and probable future—can provide the appropriate setting for judging the probable anticompetitive effects of the merger.” *United States v. General Dynamics, Corp.*, 415 U.S. 486, 498 (1974). In keeping with Complaint Counsel’s overall burden in Section 7 cases, “Complaint Counsel bears the burden of proving [the] relevant market within which” the transaction is likely to have “anticompetitive effects.” *In re Polypore Int’l, Inc.*, 2010 WL 9434806, at \*165 (internal citation omitted).

Next, Complaint Counsel must prove the effect of the transaction “may be substantially to lessen competition, or to tend to create a monopoly.” *Id.* at \*165. Courts commonly conceive of this phase of the case as a three-step burden-shifting framework. First, Complaint Counsel must establish a prima facie case by showing that the transaction would “produce a firm controlling an undue percentage share of the relevant market, and would result in a significant increase in the concentration of firms in that market.” *FTC v. H.J. Heinz Co.*, 246 F.3d 708, 715 (D.C. Cir. 2001) (alterations omitted).

Second, if Complaint Counsel succeeds in making out a prima facie case, the burden shifts to Respondents to “show that the market-share statistics give an inaccurate prediction of the

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<sup>25</sup> Complaint Counsel also challenges the transaction under Section 5 of the FTC Act, which “declare[s] unlawful” “[u]nfair methods of competition in or affecting commerce.” 15 U.S.C. § 45. “The allegation that the acquisition is a Section 5 violation, as well as a Section 7 violation, does not require an independent analysis.” *In re Polypore Int’l, Inc.*, No. 9327, 2010 WL 9434806, at \*164 (FTC Mar. 1), *adopted as modified by* 2010 WL 5132519 (FTC Dec. 13, 2010).

proposed acquisition's probable effect on competition." *FTC v. Staples, Inc.*, 970 F. Supp. 1066, 1083 (D.D.C. 1997). "Respondents are not required to 'clearly' disprove future anticompetitive effects, because such a requirement would impermissibly shift the ultimate burden of persuasion." *In re Chicago Bridge & Iron Co., et al.*, No. 9300, 2004 WL 5662266, at \*158 (FTC Dec. 22, 2004) (quoting *United States v. Baker Hughes*, 908 F.2d 981, 991 (D.C. Cir. 1990)). Instead, Respondents may rely on a variety of factors to undermine Complaint Counsel's statistical prima facie case, including "a showing of sufficient efficiencies" resulting from the transaction, *United States v. H&R Block, Inc.*, 833 F. Supp. 2d 36, 89 (D.D.C. 2011), "the trend of the market either toward or away from concentration, and the continuation of active price competition." *In re Chicago Bridge & Iron Co., et al.*, 2004 WL 5662266, at \*158.

Third, if Respondents succeed in rebutting the prima facie case of anticompetitive effects, "the burden of producing additional evidence of anticompetitive effect shifts to the government, and merges with the ultimate burden of persuasion, which remains with the government at all times." *Heinz*, 246 F.3d at 715.

Here, Complaint Counsel fails to meet its initial burden of establishing the relevant market and does not make a prima facie showing that Tronox's acquisition of Cristal may have anticompetitive effects. Complaint Counsel's gerrymandered product and geographic markets do not correspond to the reality of customer behavior, and even if they did, the combined Tronox-Cristal entity will produce *more* TiO<sub>2</sub> than the two entities individually, which makes the transaction necessarily pro-competitive. Moreover, contrary to Complaint Counsel's arguments, Chinese TiO<sub>2</sub> producers are already competitively significant, in particular Lomon Billions, the fourth largest TiO<sub>2</sub> producer in the world. For these reasons, the transaction should be allowed to proceed.

**ARGUMENT****I. ALL RUTILE TiO<sub>2</sub> COMPETES IN THE GLOBAL MARKET REGARDLESS OF PRODUCTION PROCESS.**

Complaint Counsel's theory of this case depends on defining an artificially narrow market confined to only chloride TiO<sub>2</sub> sold in North America. Complaint Counsel has failed to meet its burden to show that is a properly defined relevant market. *See In re Polypore Int'l, Inc.*, 2010 WL 9434806, at \*165. In reality, all rutile TiO<sub>2</sub>, whether produced by the chloride or the sulfate process, competes in a global market.

In fact, the Commission itself has previously recognized that the TiO<sub>2</sub> market operates globally, with chloride- and sulfate-produced products competing directly. When reviewing TiO<sub>2</sub> producer DuPont's proposed acquisition of the TiO<sub>2</sub> division of competitor Imperial Chemical Industries ("ICI") in 1998, the Commission relied on global trade flows in a single TiO<sub>2</sub> market regardless of production process. The Commission believed the DuPont/ICI transaction would result in production overlap in North America *despite* that DuPont was acquiring only ICI's *foreign* production facilities. Because "imports accounted for a majority of ICI's sales to North American customers," the transaction "would still give DuPont control over a very substantial percentage of the supply of TiO<sub>2</sub> for North American customers."<sup>26</sup> The Commission noted that "ICI was also developing new sulfate-based TiO<sub>2</sub> products to compete with DuPont's chloride-based products."<sup>27</sup> DuPont proposed remedies to ameliorate the Commission's concerns, but the Commission found them unsatisfactory, and the parties abandoned their transaction.<sup>28</sup> Complaint Counsel makes no effort to demonstrate that the TiO<sub>2</sub> market has changed so dramatically that

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<sup>26</sup> RX1598 (David A. Balto & Richard G. Parker, *The Evolving Approach to Merger Remedies* (May 1, 2000)).

<sup>27</sup> *Id.*

<sup>28</sup> *Id.*

what was formerly a global market for all rutile TiO<sub>2</sub> is now a separate, impermeable United-States-and-Canada market for only chloride TiO<sub>2</sub>.

**A. The Relevant Geographic Market Is Global.**

A properly defined geographic market charts “the region in which the seller operates, and to which the purchaser can practicably turn for supplies.” *FTC v. Cardinal Health, Inc.*, 12 F. Supp. 2d 34, 49 (D.D.C. 1998). The “evidence must address where consumers could practicably go, not ... where they actually go.” *FTC v. Tenet Health Care Corp.*, 186 F.3d 1045, 1052 (8th Cir. 1999); *see also Bathke v. Casey’s General Stores, Inc.*, 64 F.3d 340, 346 (8th Cir. 1995) (articulating the test as the distance “customers will travel in order to avoid doing business at” the entity that has raised prices rather than the distance customers would travel absent a price increase). When Complaint Counsel has identified a proposed geographic market, courts apply the “hypothetical monopolist test” to determine whether the geographic market has been well-defined. That test asks whether “a hypothetical profit-maximizing firm . . . that was the only present and future seller of [the relevant] products . . . likely would impose at least a small but significant and non-transitory increase in price (“SSNIP”).” *FTC v. Sysco Corp.*, 113 F. Supp. 3d 1, 33 (D.D.C. 2015) (quoting the Merger Guidelines § 4.1.1). The ability to impose a SSNIP “depends on interchangeability and . . . cross-elasticity of demand.” *FTC v. CCC Holdings Inc.*, 605 F. Supp. 2d 26, 38 n.12 (D.D.C. 2009). “If buyers would respond to the SSNIP by shifting to products produced *outside* the proposed geographic market, and this shift were sufficient to render the SSNIP unprofitable, then the proposed geographic market would be too narrow.” *FTC v. Arch Coal*, 329 F. Supp. 2d 109, 123 (D.D.C. 2004).

Complaint Counsel claims the relevant geographic market here is limited to North America, which Complaint Counsel further prunes to include just the United States and Canada.<sup>29</sup> Complaint Counsel claims that “North American [meaning American and Canadian] customers facing a SSNIP from a hypothetical monopolist supplier . . . would not be able to defeat the price increase . . . by purchasing TiO<sub>2</sub> outside of North America.”<sup>30</sup> But market realities show that North American producers already purchase a significant and growing percentage of the TiO<sub>2</sub> they use from other parts of the world. Prices are closely correlated across regions, and documentary evidence confirms that global trade flows shift in response to regional price and demand changes. Corrected economic modeling shows that a hypothetical monopolist could not profitably impose a SSNIP in North America, which means that Complaint Counsel’s North American (U.S./Canadian) market is improperly narrowed.

**1. North American TiO<sub>2</sub> customers are supplied significantly by imports.**

TiO<sub>2</sub> is uniquely suited to trading in a vibrant global market because “TiO<sub>2</sub> products are easy to ship, have essentially an infinite shelf life and have a reasonably low cost to serve international customers.”<sup>31</sup> The business model of TiO<sub>2</sub> producers actually *depends* on the ability to compete globally through exports because producers often concentrate their production in large plants whose production far exceeds the consumption of the local market. For example, competitor Chemours owns the three largest TiO<sub>2</sub> plants in the world, two of which are located in the United States and one in Mexico.<sup>32</sup> As even the FTC’s own expert witness, Dr. Hill, acknowledges,

<sup>29</sup> RX1399 (Compl.) at ¶ 30 (“The relevant geographic market . . . is the sale of relevant products to North American customers.”); *id.* ¶ 1 (defining “North America” as “the United States and Canada”).

<sup>30</sup> *Id.* ¶ 35.

<sup>31</sup> [REDACTED] (quoting RX1182 (“Bouncing Off the Bottom of the TiO<sub>2</sub> Market,” PCI: Paint & Coatings Industry, July 5, 2016)).

<sup>32</sup> [REDACTED]

Chemours exports [REDACTED] from the United States, which is more than the entire production of any one single plant.<sup>33</sup>

Tronox's competitors also acknowledge imports as a source of competition against their products and prices. [REDACTED]

[REDACTED]

TiO2 producers in every region of the world, including North America, supply their products globally. Trade flows in and out of North America amply demonstrate that the North American market does not operate in isolation. The sum of all imports to and exports from North America each year is *greater* than total North American TiO2 consumption.<sup>37</sup> In particular, imports account for nearly a quarter of TiO2 consumption in North America,<sup>38</sup> while at most [REDACTED] of the TiO2 produced in North America is shipped to customers in North America to stay in the region.<sup>39</sup> Moreover, the amount of TiO2 imported to North America is rising year by year. In 2010, imported TiO2 accounted for [REDACTED] of North American consumption, but by 2016, that number had risen to [REDACTED] of North American consumption.<sup>40</sup> This substantial increase in exports is disproportionately driven by the increased competitive presence of Chinese producers in North

33 [REDACTED]  
34 [REDACTED]  
35 [REDACTED]  
36 [REDACTED]  
37 [REDACTED]  
38 [REDACTED]  
39 [REDACTED]  
40 [REDACTED]

America. Although no Chinese producers make TiO<sub>2</sub> in North America, Chinese producers now account for [REDACTED] of TiO<sub>2</sub> consumed in North America. That figure is [REDACTED] greater than the percentage of North American TiO<sub>2</sub> consumption that Chinese producers accounted for in 2010.<sup>41</sup>

Mapping Tronox's and Cristal's trade flows confirms that TiO<sub>2</sub> moves on a global scale. Each year, Tronox exports approximately [REDACTED] of the production at its Hamilton, Mississippi plant to Latin America and another [REDACTED] to other regions, principally Europe and Asia.<sup>42</sup> Global competition affects these numbers, however, even when the competitive shift takes place in other regions. For example, Tronox has experienced falling export numbers to Latin America from its North American facility due to an influx of Chinese competition in that region.<sup>43</sup> Cristal likewise exports [REDACTED] of production from its Ashtabula, Ohio plant outside of North America.<sup>44</sup> Both Tronox and Cristal have also chosen to concentrate their production of specific TiO<sub>2</sub> grades at particular plants located within a single region despite selling those grades globally. Tronox makes its 8120 and 8400 grades only at its Botlek (the Netherlands) facility, but sells them around the world, including in the U.S.<sup>45</sup> Tronox only makes its grade CR-880 TiO<sub>2</sub> at the Hamilton plant, where the production process is most efficient for doing so, but Tronox sells that grade in Europe and Asia as well as North America.<sup>46</sup> Tronox has also stopped producing its grade CR-813 TiO<sub>2</sub> at its Kwinana, Australia plant, despite continuing to supply that grade to Australian customers.<sup>47</sup>

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<sup>45</sup> PX0017 (excerpted) (Tronox spreadsheet of volumes by country and material grade, 2012-2016); PX0017 (excerpted) (Tronox production by plant and grades 2014-2016).

<sup>46</sup> *Id.* ¶ 244.

<sup>47</sup> *Id.*

Complaint Counsel’s results-driven, sales to “North America” market is particularly artificial because it limits “North America” to the United States and Canada while excluding Mexico. Numerous industry resources, including those on which Complaint Counsel’s expert, Dr. Hill, relies, include Mexico as part of North America when reporting information about the TiO<sub>2</sub> industry.<sup>48</sup> While that convention is not universal among industry analysts, it is plainly consistent with the reality of TiO<sub>2</sub> production on the North American continent: Mexico is an easily accessible source of TiO<sub>2</sub> for U.S. customers. Since 2016, competitor Chemours has relocated TiO<sub>2</sub> production capacity formerly located in the United States to a newly expanded plant in Altamira, Mexico, which is now one of the largest TiO<sub>2</sub> production facilities in the world.<sup>49</sup> The Altamira plant did not rob the U.S. and Canada of TiO<sub>2</sub> production because the Altamira plant serves customers in those countries, who pay no duty on TiO<sub>2</sub> imports when receiving product from Mexico.<sup>50</sup> Complaint Counsel has made no attempt to justify the unreasonable exclusion of Mexico from the so-called North American market, other than the fact that Cristal places Mexico in its Latin American region for administrative purposes. This is not an antitrust basis for geographic market definition.

**2. Prices in North America are co-integrated with global prices.**

The undisputed global trade flow of TiO<sub>2</sub> predictably drives prices in geographic regions to remain closely correlated. While prices sometimes vary among geographic regions on absolute terms, the evidence demonstrates that TiO<sub>2</sub> prices move and adjust on a global, not a North American, scale. TiO<sub>2</sub> prices are [REDACTED] because [REDACTED]

[REDACTED]<sup>51</sup> Prices strongly correlate

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<sup>48</sup> *Id.* ¶ 98.

<sup>49</sup> *Id.* ¶ 99.

<sup>50</sup> *Id.*

<sup>51</sup> [REDACTED]

between regions, with Tronox price correlations being [REDACTED] between the U.S. and Europe and the U.S. and South America, and [REDACTED] between the U.S. and APAC and the U.S. and MEAI over the last 5 years.<sup>52</sup> Cristal price correlations are similarly close.<sup>53</sup>

Price also induces TiO2 to flow from one region to another when it is profitable to do so. When prices rise in the U.S. relative to other regions, net imports also increase soon thereafter, as TiO2 producers arbitrage the price by selling more product in the U.S.<sup>54</sup> By way of demonstration,

[REDACTED]

[REDACTED]

[REDACTED]

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52 [REDACTED]

53 Correlations between the U.S. and Europe are [REDACTED] between the U.S. and South America, [REDACTED] between the U.S. and APAC, and [REDACTED] between the U.S. and MEAI. *Id.* [REDACTED]

54 RX1336 and RX1337 (IHS Global Trade Atlas data provided by Tronox); [REDACTED]

55 [REDACTED]  
56 [REDACTED]  
57 [REDACTED]

Customer-specific pricing information confirms that prices equilibrate across regions because producers can choose to purchase TiO2 globally and use that reality as leverage when negotiating price. For example, large, multinational paint companies have significant buying power when purchasing from TiO2 manufacturers and [REDACTED]

[REDACTED]

[REDACTED]<sup>58</sup> Customers are also encouraging increasing imports from China into North America to expand customers' buying power in negotiations with North American producers.<sup>59</sup>

The globalizing price pressures at work in the TiO2 market are only increasing as a result of significant market consolidation due to mergers and acquisitions among leading TiO2 customers.

This globalization is forcing [REDACTED]

[REDACTED]<sup>60</sup>

TiO2 trade flows outside of North America also affect available supply within North America, further demonstrating the global reality of the TiO2 market. When Chinese exports supply customers that had been previously supplied by TiO2 produced in North America, the result is additional product in North America [REDACTED]

[REDACTED]

[REDACTED]

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58 [REDACTED]

59 [REDACTED]

60 [REDACTED]

61 [REDACTED]

**3. In the United States/Canada geographic market, a hypothetical monopolist would not be able to impose a SSNIP.**

Applying the hypothetical monopolist test to Complaint Counsel’s so-called North American (United States/Canada) geographic market reveals that the market is not properly defined. North American customers have the incentive and ability to turn to the significant quantities of TiO<sub>2</sub> already moving in global trade flows to bring incremental supply into North America and render a SSNIP by a hypothetical monopolist unprofitable.<sup>62</sup> Complaint Counsel’s expert, Dr. Hill, reaches the opposite conclusion on the basis of flawed economic modeling. As Tronox’s expert, Dr. Ramsay Shehadeh, demonstrates, Dr. Hill implements the hypothetical monopolist test incorrectly by giving the hypothetical monopolist control over supply both inside *and outside* the proposed relevant market.<sup>63</sup> Dr. Hill unjustifiably assumes that North American customers will not be able to respond to the hypothetical monopolist’s SSNIP by seeking supply from plants outside the proposed geographic market *that have nearly identical logistics to current suppliers inside the market.*<sup>64</sup> As a result of imposing these assumptions, Dr. Hill’s model is rigged: when the hypothetical monopolist controls supply both inside and outside the proposed market, any geographic market can be [REDACTED]<sup>65</sup> [REDACTED]

[REDACTED]<sup>66</sup>

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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**4. Ordinary course documents confirm that the TiO2 market is global.**

Ordinary course documents confirm what the economic analysis shows: the TiO2 market is global. [REDACTED]

[REDACTED]<sup>67</sup> Their publicly-traded competitors do the same in their SEC filings.<sup>68</sup> Business communications within Tronox and Cristal further reveal firsthand evidence that customers make import decisions based on price sensitivity. For example, [REDACTED]

[REDACTED] Competitor Venator's downed sulfate plant in Pori, Finland provides a natural experiment in observing international TiO2 trade flows. In January 2017, a fire destroyed the Pori

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67 [REDACTED]

68 [REDACTED]

69 [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

plant's production capacity, forcing it to shut down fully. [REDACTED]

**B. The Relevant Product Market Is All Rutile TiO<sub>2</sub>, Whether Manufactured By The Chloride Or The Sulfate Process.**

Complaint Counsel also bears the burden of proving the relevant product market. *In re Polypore Int'l, Inc.*, 2010 WL 9434806, at \*165. The “outer boundaries of a product market are determined by the reasonable interchangeability of use by consumers and the cross-elasticity of demand between the product itself and substitutes for it.” *Staples, Inc.*, 970 F. Supp. at 1074 (alteration omitted). “Relevant [product] markets will generally include producers who, given product similarity, have the ability to take significant business from each other.” *Arch Coal*, 329 F. Supp. 2d at 119. Here, Complaint Counsel constructs an improper product market composed only of TiO<sub>2</sub> produced through the chloride process. In reality, chloride-produced and sulfate-produced TiO<sub>2</sub> are interchangeable in at least 80% of applications. Statistical analysis reveals that chloride and sulfate prices are co-integrated, meaning that they move together and equilibrate over time. Ordinary course documents confirm that suppliers of chloride-produced TiO<sub>2</sub> are constrained by the supply of sulfate-produced TiO<sub>2</sub> available to customers in the market. Complaint Counsel has failed to meet its burden to demonstrate that chloride-only TiO<sub>2</sub> is a relevant product market.

**1. Chloride-produced and sulfate-produced TiO2 are interchangeable in the vast majority of applications.**

Independent analyses of TiO2 applications agree that sulfate-produced and chloride-produced TiO2 are interchangeable in at least [REDACTED] of applications.<sup>74</sup> Although some specialty uses demand or prefer TiO2 derived from a particular process, these specialty uses account for a small percentage of total TiO2 consumption.<sup>75</sup> Industry observer TZMI describes how [REDACTED] [REDACTED]<sup>76</sup> The European Commission has confirmed this market reality, observing that chloride- and sulfate-produced TiO2 are interchangeable in the vast majority of applications: [REDACTED]

[REDACTED]

[REDACTED] A Barclay's report reinforces that conclusion, explaining that [REDACTED] [REDACTED]<sup>78</sup>

Because most TiO2 customers do not have a preference as between chloride-produced and sulfate-produced TiO2, most customers are able to switch between producers using different technologies if the right arbitrage exists and the TiO2 meets the customer's requirements.<sup>79</sup>

74 [REDACTED]  
75 [REDACTED]  
76 [REDACTED]  
77 [REDACTED]  
78 [REDACTED]  
79 [REDACTED]

Competitor Kronos, for example, produces TiO<sub>2</sub> from both the chloride and the sulfate process and says “manufacturers of many end-use applications can use either form, especially during periods of tight supply for TiO<sub>2</sub>.”<sup>80</sup>

Complaint Counsel avoids confronting the well-recognized, extensive interchangeability between chloride-produced and sulfate-produced TiO<sub>2</sub> by relying on anecdotal customer testimony that provides an incomplete picture of industry-wide TiO<sub>2</sub> uses. Complaint Counsel cites customers who say they cannot switch between chloride- and sulfate-produced TiO<sub>2</sub>, but Complaint Counsel provides no support for the assertion that these customers account for “most” of the TiO<sub>2</sub> market.<sup>81</sup> In fact, many of the quotations on which Complaint Counsel relies are limited to narrow, specialty applications.<sup>82</sup> Even among those specialty applications, Complaint Counsel neglects to mention that a customer who claimed to be unable to switch to sulfate-produced TiO<sub>2</sub> had, in fact, *spent years using sulfate-produced TiO<sub>2</sub> for the formulation in question.*<sup>83</sup> And where customers claim that most of their applications do not permit switching, Complaint Counsel makes no effort to demonstrate that any such conduct by those customers is representative of TiO<sub>2</sub> uses generally.<sup>84</sup>

Complaint Counsel also misleadingly portrays the process of qualifying TiO<sub>2</sub> grades for particular applications, which is a necessary precondition for the ability to switch between TiO<sub>2</sub> products. Qualifying a TiO<sub>2</sub> grade can, indeed, be a lengthy process, as Complaint Counsel claims. But once a particular TiO<sub>2</sub> grade has been qualified, a customer can switch among qualified TiO<sub>2</sub>

<sup>80</sup> [REDACTED] (quoting RX1079 (2016 Kronos Form 10K) at 6).

<sup>81</sup> FTC Pre-Trial Br. at 11-12.

<sup>82</sup> *Id.* (quoting customers’ views on switching for a specific “Ultra Pure White” product and for “thin film plastics”)

<sup>83</sup> [REDACTED]

<sup>84</sup> FTC Pre-Trial Br. at 11-12

grades at will.<sup>85</sup> This means customers can rely on a stable of qualified grades of TiO<sub>2</sub>, including those produced by competing manufacturers and grades produced by different production processes.<sup>86</sup> Moreover, the process of qualifying a grade of TiO<sub>2</sub> for use in a particular application is entirely blind to the process by which the grade of TiO<sub>2</sub> was produced. Qualifying a grade depends on matching the specifications of a particular grade of TiO<sub>2</sub> with the attributes required of the end-use application, and testing the resulting formulation.<sup>87</sup> So long as a grade's specifications can produce the needed qualities in an end-use application, the production process used to make the grade is irrelevant.

**2. Prices of chloride-produced and sulfate-produced TiO<sub>2</sub> are co-integrated.**

Statistical evidence confirms that chloride-produced and sulfate-produced TiO<sub>2</sub> are largely interchangeable because prices between the two are co-integrated, meaning that they move together and equilibrate over time. Statistical analysis of monthly prices for chloride- and sulfate-produced TiO<sub>2</sub> are positively correlated in a statistically and economically significant way among the Western Producers who utilize both manufacturing processes.<sup>88</sup>

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86 RX0125 (G. Arrowood Dep. Tr.) 47 (Q: Do you know if there is a difference in the qualifying process depending on whether the TiO<sub>2</sub> is manufactured via the sulfate process versus the chloride process, or is the qualifying process the same for Deceuninck North America? A: To my knowledge... the qualification process would be the same because what we're looking for in the end product is ultraviolet performance, weatherability performance, maybe impact performance, the brittleness or whatever, all those different attributes. What we're concerned with is the end result of that product. So to my knowledge, the qualification process would be the same.);

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**3. Complaint Counsel’s proposed product market is poorly defined because a hypothetical monopolist could not profitably impose a SSNIP.**

Applying the hypothetical monopolist test to Complaint Counsel’s proposed chloride-only product market reveals that the proposed market is too narrow. The FTC’s expert, Dr. Hill, uses flawed economic modeling based on flawed data in applying the hypothetical monopolist test. For example, Dr. Hill excludes the price of sulfate-produced TiO<sub>2</sub> from his regression analysis, adopting the irrational expectation that a customer purchasing chloride-produced TiO<sub>2</sub> would not even consider the price of sulfate-produced TiO<sub>2</sub> when making the economic decision of whether to accept a price increase.<sup>89</sup> Dr. Hill also determines monthly prices by dividing annual prices by 12, an approach that fails to account for the month-to-month variation in TiO<sub>2</sub> prices. Correcting Dr. Hill’s errors changes the results of Dr. Hill’s hypothetical monopolist test, revealing that a hypothetical monopolist would not be able to profitably impose a SSNIP on chloride-produced TiO<sub>2</sub> because of the ability of customers to shift consumption to sulfate-produced TiO<sub>2</sub>.<sup>90</sup>

**4. Ordinary course documents confirm that chloride-produced and sulfate-produced TiO<sub>2</sub> compete in the same product market for all rutile TiO<sub>2</sub>.**

Ordinary course documents confirm what statistical evidence shows: rutile TiO<sub>2</sub> competes in the single product market regardless of whether it is derived from the chloride or sulfate manufacturing process.

In the ordinary course of business, customers can and do reformulate their products to use either chloride- or sulfate-produced TiO<sub>2</sub>, giving them flexibility and negotiating power when purchasing from suppliers.<sup>91</sup> [REDACTED]

89 [REDACTED]

90 [REDACTED]

91 [REDACTED]

(citing, *inter alia*, [REDACTED])

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Other

North American customers have qualified sulfate grades of TiO<sub>2</sub> for use in paint coatings and plastics and can switch to them when it is advantageous to do so.<sup>97</sup>

TiO<sub>2</sub> producers also consider chloride- and sulfate-produced TiO<sub>2</sub> as substitutable in their business documents. [REDACTED]

[REDACTED] Competitors Chemours, Huntsman (Venator), and Kronos have included similar capacity figures combining chloride and

92 [REDACTED]

93 [REDACTED]

94 [REDACTED]

95 [REDACTED]

96 [REDACTED]

97 [REDACTED]

98 [REDACTED]

sulfate figures in their public statements.<sup>99</sup> Moreover, TiO<sub>2</sub> suppliers often do not know whether they are competing against chloride or sulfate grades when they communicate with customers about pricing and sales. Information about competing products usually comes from customers, who may limit transparency on the details of competing products.<sup>100</sup>

Market realities, statistical modeling, and ordinary course business documents all point to a single conclusion: rutile TiO<sub>2</sub> competes in a single product market regardless of the production process from which it is derived. Complaint Counsel’s proposed chloride-only product market is improperly defined.

**C. In A Properly Defined Geographic And Product Market, Post-Transaction Market Concentration Is Too Low To Threaten Competition.**

Complaint Counsel’s claim that the combined company will have a 38% market share post-merger is a product of their results-driven geographic and product market definitions. As shown, Complaint Counsel has failed to meet its burden to show that the relevant market is only chloride TiO<sub>2</sub> consumed in the United States and Canada.

The actual relevant market is the *global* market for *all rutile* TiO<sub>2</sub>, regardless of production process. When that appropriate market is considered, the post-merger market remains unconcentrated and the combined company’s market share is too small to be associated with unilateral or coordinated competitive effects.<sup>101</sup> The combined entity will be one of thirty-six

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<sup>99</sup> *Id.* (citing RX1092 (Feb. 2017 Chemours Investor Presentation); RX1267 (Venator, “Huntsman Announces Global Titanium Dioxide Price Increases,” May 8, 2017); RX1079 (2016 Kronos Form 10-K) at 10 (“The top five TiO<sub>2</sub> producers (i.e. we and our four principal competitors) account for approximately 58% of the world’s production capacity.”)).

100 [REDACTED]

101 [REDACTED]

competitors in the relevant market, with an approximate [REDACTED] share of production and [REDACTED] share of capacity.<sup>102</sup> Even if Complaint Counsel can show a relevant market limited to U.S. sales, the Merger Guidelines, §5.2, provide that, in a commodity market, market share should be calculated based on capacity readily available to serve the market. Thus, even in a TiO<sub>2</sub> market limited to U.S. sales, market share should be calculated globally because global TiO<sub>2</sub> production serves North America.

**II. EVEN IF COMPLAINT COUNSEL HAS ESTABLISHED A PRIMA FACIE CASE, RESPONDENTS CAN REBUT IT.**

Even if Complaint Counsel has established a prima facie case, it is a weak one, and Respondents will rebut it. “In *General Dynamics*, the Supreme Court cautioned that, although significant, statistics concerning market share and concentration are ‘not conclusive indicators of anticompetitive effects.’” *Arch Coal*, 329 F. Supp. 2d at 130 (citing 415 U.S. at 498). Here, adopting Complaint Counsel’s chloride-only, United-States-and-Canada market provides Complaint Counsel only with bare market share and concentration statistics that cannot, standing alone, meet Complaint Counsel’s ultimate burden to prove the transaction is likely to have anticompetitive effects. Courts have “cautioned against relying too heavily on a statistical case of market concentration alone, and that instead a broad analysis of the market to determine any effects on competition is required.” *Id.* at 130.

To rebut Complaint Counsel’s prima facie case, Respondents need only to “show that the prima facie case inaccurately predicts the relevant transaction’s probable effect on future competition.” *Baker Hughes*, 908 F.2d at 991. A sliding scale approach applies, such that a defendant need not present as much evidence when rebutting a less compelling prima facie case.

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<sup>102</sup> [REDACTED]

*Id.* Among the types of evidence a defendant may present to rebut the prima facie case are efficiencies evidence particular to the transaction, *Heinz*, 246 F.3d at 720, and evidence of new market entrants that will disrupt existing market concentrations, *United States v. Aetna Inc.*, 240 F. Supp. 3d 1, 52-53 (D.D.C. 2017). *See also* RX0199 (Aug. 19, 2010 Horizontal Merger Guidelines) at § 9 (new entry can “alleviate concerns about adverse competitive effects”).

Here, Complaint Counsel cannot demonstrate that this transaction will have anticompetitive effects on the TiO<sub>2</sub> industry. Quite the opposite: the entire transaction is premised on decreasing marginal costs and increasing output, which will necessarily inure to the benefit of TiO<sub>2</sub> customers. These synergies are transaction-specific and cannot be realized apart from this transaction. Additionally, a broad market analysis reveals that Chinese TiO<sub>2</sub> producers are a legitimate and growing threat as they consistently gains market share in North America in competition with Western producers.

**A. Transaction-Specific Synergies Will Result In Increased TiO<sub>2</sub> Output And Benefits To Consumers.**

Transaction-specific synergies will result in increased TiO<sub>2</sub> output, affirmatively benefitting consumers. The economics of TiO<sub>2</sub> production will incentivize the combined company to maximize production in order to minimize marginal costs. The transaction will also create a vertically-integrated TiO<sub>2</sub> producer, balancing feedstock storage and production capabilities to reduce marginal costs as compared to each entity operating alone. Additionally, applying Tronox’s expertise to Cristal’s underperforming facilities in Saudi Arabia will further enhance production at both the feedstock and the pigment level. These verifiable synergies will result in greater TiO<sub>2</sub> production at lower marginal costs, yielding lower prices for consumers.

**1. The economics of TiO2 production incentivize operating at peak capacity to maximize efficiency.**

The TiO2 industry bears exceptionally high fixed costs, including labor, maintenance, taxes, and overhead, which constitute up to [REDACTED] of manufacturing costs.<sup>103</sup> Among these costs, maintenance costs are particularly high because both the chloride and sulfate production processes rely on corrosive chemicals.<sup>104</sup> Due to high fixed costs, manufacturers focus on efficiency as their primary financial operating goal. Manufacturers achieve operating efficiency by maximizing production, in turn reducing the overall fixed cost per unit of output. A mere [REDACTED] improvement in production can increase margins as much as [REDACTED] per metric ton of product with no additional fixed costs.<sup>105</sup> Rising operating rates lead to rising profitability in the TiO2 industry.<sup>106</sup>

Accordingly, in the TiO2 industry, diluting fixed costs by maximizing production is the central focus of operational planning.<sup>107</sup> An important health measure of a TiO2 facility's production is the [REDACTED].<sup>108</sup> Low operating rates are not economically sustainable in the TiO2 industry because of high fixed costs.<sup>109</sup> Furthermore, the nature of TiO2 production lines causes significant changes in operating rates to negatively affect the quality and cost of the product produced.<sup>110</sup> This is particularly true of large, continuous production chloride lines, which function by turning metals into pigment powder under very high heat. When a chloride line is idled, it cools and metallic debris hardens,

103 [REDACTED] RX0105 (TZMI, "Global TiO2 Pigment Producers Comparative Cost & Profitability Study," 2016) at 100.

104 [REDACTED]  
105 [REDACTED] (citing RX0105 (TZMI, "Global TiO2 Pigment Producers Comparative Cost & Profitability Study," 2016) at 115).

106 [REDACTED]  
107 [REDACTED]  
108 [REDACTED]  
109 [REDACTED]  
110 [REDACTED]



Maintaining a reliable supply of feedstock depends on investment in mines, which is significant and pays off only years after the fact. Historically, TiO<sub>2</sub> manufacturers have experienced feedstock shortages when mines owned by non-TiO<sub>2</sub> producers pursued more profitable business opportunities for some periods of time, causing downstream feedstock shortages years later. A vertically integrated TiO<sub>2</sub> producer is incentivized to maintain appropriate investment levels at all times in its mining operations. In this way, vertical integration eliminates the risk to the combined company of fluctuations in the feedstock market like those caused by the disadvantageous mining decisions of third parties.<sup>117</sup>

The feedstock benefits of vertical integration will be further enhanced by the repair and restart of Cristal's defunct Jazan slagger. *See infra*, Background. Despite investing ██████████ in developing the Jazan slagger to upgrade feedstock,<sup>118</sup> Cristal has been unable to make a return on its investment. The Jazan slagger has been plagued by operational problems, even an explosion, and is not currently functioning at all.<sup>119</sup> Tronox, however, possesses the unique expertise to bring the Jazan slagger online, as Cristal has persistently failed to do.<sup>120</sup> So confident is Tronox in its ability to start the Jazan slagger, it has entered an agreement with Cristal (dependent on this transaction) by which Tronox has committed its own resources and technical knowledge to the project and has granted Cristal the right to force Tronox to purchase the slagger upon achieving certain benchmarks.<sup>121</sup> Under the agreement and a related Technical Services Agreement, Tronox

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██████████ (citing, *inter alia*, ██████████  
see also RX1600 (Tronox Form 8-K (May 10, 2018))).

is already contributing financially, technically, and operationally to bring the Jazan slagger into operation.<sup>122</sup> Tronox will loan up to \$125 million to facilitate slagger start-up. Successfully initiating production at the Jazan slagger will inject approximately [REDACTED] of additional high-grade feedstock into the combined company's feedstock supply.<sup>123</sup> This quantity of high-grade feedstock would be enough to feed the annual needs of the world's largest most productive TiO2 production facility.<sup>124</sup> Tronox has conducted in-depth diligence in developing its plan to repair the Jazan slagger.<sup>125</sup>

**3. The combined company will further reduce fixed costs through operating rates.**

The combined company will further reduce fixed costs by increasing its operating rates through implementing Tronox's established, proven best practices.

Historically, Cristal's Yanbu (Saudi Arabia) pigment plant has operated well below nameplate capacity.<sup>126</sup> Despite attempts to expand Yanbu's capacity, Cristal has been persistently unable to address existing bottlenecks and other challenges that limit operations at Yanbu.<sup>127</sup> Tronox, however, is uniquely positioned to improve operations at Yanbu because the facility runs on technology owned by Tronox's former parent company, Kerr-McGee, and Tronox operates that same technology to great success at its Hamilton (Mississippi) pigment plant.<sup>128</sup> Since 2012, on average, Yanbu operates at [REDACTED] of nameplate capacity, while Hamilton operates at [REDACTED] of

122 [REDACTED]  
123 [REDACTED]  
124 [REDACTED]; RX0105 (TZMI, "Global TiO2 Pigment Producers Comparative Cost & Profitability Study," 2016) at 80).  
125 [REDACTED]  
126 [REDACTED]  
127 [REDACTED]  
128 [REDACTED]

nameplate capacity.<sup>129</sup> Tronox has a well-developed plan for increasing production at Yanbu in line with its achievements in Hamilton, which Tronox conservatively estimates will increase Yanbu production by [REDACTED] of TiO2 per year.<sup>130</sup>

Tronox's output improvements will increase TiO2 output at other Cristal facilities as well. Currently, Tronox plant production rates exceed the rates at Cristal plants by approximately [REDACTED] points.<sup>131</sup> Applying Tronox talent, best practices, and intellectual property to Cristal facilities will yield higher operating rates at Cristal facilities.<sup>132</sup> Tronox has predicted that it will be able to increase production at Cristal facilities by [REDACTED] of TiO2 per year.<sup>133</sup> That number is conservative. If Tronox is able to increase Cristal plant production to *match* its own average rates at Tronox plants, the post-transaction company will actually produce an additional [REDACTED] per year of TiO2 pigment. Even increasing Cristal plant production *half* that amount would still yield [REDACTED] of additional TiO2 per year, which is more than Tronox's conservative prediction.<sup>134</sup>

**B. China Is A Powerful New Market Entrant And Is Rapidly Gaining Share Of North American Sales.**

Chinese TiO2 producers are new market entrants in North America, rapidly gaining market share. Complaint Counsel improperly dismisses the importance of TiO2 suppliers from China, particularly Lomon Billions, the fourth largest TiO2 supplier in the world by capacity.<sup>135</sup> The evidence clearly shows that Chinese producers are significant competitors in North America and

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[REDACTED]

must be credited, at least, as “rapid entrants”—suppliers with “readily available ‘swing’ capacity currently used in adjacent markets that can easily and profitably be shifted to serve” North American customers.<sup>136</sup> Chinese firms’ imports into North America are growing as a share of North American apparent consumption (North American production plus imports, less exports), and traditional “Western” TiO2 producers view Chinese producers as strong competitors. TiO2 customers already purchase, or threaten to purchase, Chinese TiO2 to replace “Western” TiO2.

Over the past five years, China’s TiO2 capacity, production, and exports have grown at a rapid pace. China is now the largest TiO2 producing country in the world.<sup>137</sup> From 2012 to 2017, total TiO2 capacity in China grew almost [REDACTED] while total TiO2 production grew over [REDACTED].<sup>138</sup> From 2010 to 2016, China’s exports and its share of global demand have more than doubled.<sup>139</sup> Chinese imports into North America have grown no less rapidly. From 2010 to 2016, the share of North American apparent TiO2 consumption for Chinese imports increased by more than [REDACTED] from [REDACTED] to [REDACTED].<sup>140</sup>

TZMI recently observed that one Chinese producer in particular, Lomon Billions, “promises to disrupt the [TiO2] market for years to come.”<sup>141</sup> While traditionally a sulfate TiO2 supplier, Lomon Billions is an important and growing chloride TiO2 supplier. As part of a long-

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<sup>136</sup> RX0199 (Aug. 19, 2010 Horizontal Merger Guidelines) at § 5.1; *see also United States v. Falstaff Brewing Corp.*, 410 U.S. 526, 531-32 (1973) (“The existence of an aggressive, well equipped and well financed corporation engaged in the same or related lines of commerce waiting anxiously to enter an oligopolistic market would be a substantial incentive to competition which cannot be underestimated”),

<sup>137</sup> [REDACTED]

<sup>138</sup> [REDACTED]

<sup>139</sup> [REDACTED]

<sup>140</sup> [REDACTED]

<sup>141</sup> RX0225 (TZMI, “TiO2 Pigment Price Forecast to 2020,” Q4 2016) at 9 (emphasis omitted).

term supply contract established to further collaboration between Lomon Billions and PPG, Lomon Billions built a chloride plant in Henan China using technology provided by PPG.<sup>142</sup> Beginning in December 2015, PPG started using chloride TiO2 produced at the facility.<sup>143</sup> In 2018, Lomon Billions announced plans to construct two new chloride TiO2 manufacturing lines at an existing facility in Jiaozuo, China, adding capacity of [REDACTED] for a total capacity of [REDACTED] which will make the facility one of the largest TiO2 plants in the world.<sup>144</sup> [REDACTED]

[REDACTED]<sup>145</sup> Lomon Billions announced that commercial production from these new lines is expected to start [REDACTED].<sup>146</sup>

“Western” TiO2 producers are experiencing increasing competition from Chinese producers in North America as a number of North American customers have purchased, have plans to purchase, or have threatened to purchase Chinese TiO2. For example:

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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<sup>142</sup> [REDACTED]; RX0229 (Dec. 15, 2015 PPG Press Release, “PPG Begins Using Chloride-Based TiO2 from Henan Billions in Coatings Production”) at 1

<sup>143</sup> RX0229 (Dec. 15, 2015 PPG Press Release, “PPG Begins Using Chloride-Based TiO2 from Henan Billions in Coatings Production”) at 1.

<sup>144</sup> [REDACTED]

<sup>145</sup> [REDACTED]

<sup>146</sup> [REDACTED]

<sup>147</sup> [REDACTED]

148

[REDACTED]

149

[REDACTED]

150

[REDACTED]

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[REDACTED]

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[REDACTED]

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[REDACTED]

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[REDACTED]

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[REDACTED]

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[REDACTED]

This extensive (though not exhaustive) evidence shows that China-produced TiO<sub>2</sub> is already of sufficient quality to compete effectively against TiO<sub>2</sub> produced by “Western” suppliers—and it is continuing to improve. [REDACTED]

[REDACTED]

157 [REDACTED]  
158 [REDACTED]  
159 [REDACTED]  
160 [REDACTED]  
161 [REDACTED]

[REDACTED]

Because the TiO2 market is global, supplies of Chinese TiO2 into other regions increases competition in North America.<sup>166</sup> This occurs when lower-cost Chinese TiO2 sent to other export markets displaces TiO2 from “Western” suppliers, making that displaced TiO2 available for customers in North America.<sup>167</sup> [REDACTED]

[REDACTED]

Brazil is a powerful example of this phenomenon of Chinese “displacement.” In 2016, Brazil imported approximately [REDACTED] of TiO2 from the U.S. (down from more than [REDACTED] in 2010), but the country more than doubled the amount of TiO2 imported from China.<sup>169</sup> Brazil shifted from being a large importer of North American TiO2 to importing over [REDACTED] percent

162 [REDACTED]

163 [REDACTED]

164 [REDACTED]

165 [REDACTED]

166 [REDACTED]

167 [REDACTED]

168 [REDACTED]

169 [REDACTED]

of its demand from China.<sup>170</sup> A similar trend occurred in South Korea over the same time period as the market experienced an influx of Chinese imports that prompted a sharp decline in U.S. exports.<sup>171</sup> The displacement phenomenon is not limited to Brazil and South Korea: in 2016, Chinese producers accounted for an estimated [REDACTED] percent of the supply of TiO<sub>2</sub> to the Middle East, Africa, and India.<sup>172</sup>

In short, Chinese TiO<sub>2</sub> producers, particularly Lomon Billions, pose a credible, growing threat to TiO<sub>2</sub> producers in North America. Even if Complaint Counsel could show likely anticompetitive effects from the transaction, the increasing competitive force (as reflected in dramatically increasing North American market share) of Chinese TiO<sub>2</sub> producers is strong evidence showing that expansion from other producers will counteract any competitive effects of concern. *See Staples*, 190 F. Supp. 3d at 133 (defendant may rebut prima facie case “[e]ven in highly concentrated markets” by showing “that the entry or expansion of competitors will be timely, likely, and sufficient in its magnitude, character, and scope to deter or counteract the competitive effects of concern”).

### III. COMPLAINT COUNSEL CANNOT SHOW THAT COMPETITIVE EFFECTS ARE LIKELY.

Because Respondents have “show[n] that the market-share statistics give an inaccurate prediction of the proposed acquisition’s probable effect on competition,” *Staples*, 970 F. Supp. at 1083, “the burden of producing additional evidence of anticompetitive effect shifts to the government, and merges with the ultimate burden of persuasion, which remains with the

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government at all times,” *Heinz*, 246 F.3d at 715. Here, Complaint Counsel cannot show that the transaction is likely to have anti-competitive effects. The combined company will have no incentive to unilaterally decrease output, as economic modeling proves. Nor can Complaint Counsel meet its burden to show that coordinated effects are likely as a result of the transaction.

**A. The Post-Transaction Combined Company Will Have No Incentive To Unilaterally Decrease Output.**

Where competitors in the same market combine businesses, the transaction may have unilateral anticompetitive effects “if the acquiring firm will have the incentive to raise prices ... independent of competitive responses from other firms.” *H&R Block*, 833 F. Supp. 2d at 81. Anticompetitive effects are also more likely when “the merger would result in the elimination of a particularly aggressive competitor in a highly concentrated market.” *Staples*, 970 F. Supp. at 1083. Complaint Counsel claims that Tronox’s acquisition of Cristal will lead to unilateral output decreases, but in fact, the evidence demonstrates *no* incentive for the combined company to decrease production unilaterally.

**1. As already described, profitability in the TiO<sub>2</sub> industry depends on running production full-out.**

As described in Section II.A, the TiO<sub>2</sub> industry increases profitability by increasing operating rates at pigment facilities. Furthermore, the transaction-specific synergies here show that this transaction will incentivize the combined company to unlock new production volumes at underperforming Cristal facilities. *See* Section II.A.

**2. The transaction does not eliminate “a particularly aggressive competitor.”**

Complaint Counsel cannot show that anticompetitive effects are more likely because combining Tronox and Cristal will eliminate Cristal as a “particularly aggressive competitor.” *Staples*, 970 F. Supp. at 1083. [REDACTED]

[REDACTED]

[REDACTED] 173

**3. Dr. Hill’s economic modeling, when performed correctly, does not show that the combined company could profitably decrease production unilaterally.**

Complaint Counsel’s economic expert, Dr. Hill, has supplied two “capacity closure” simulations that he claims show the combined company will be incentivized to decrease production unilaterally to inflate price. In fact, both show that even a small competitive response is sufficient to render an attempt to reduce supply unprofitable.

Dr. Hill provided his first capacity-closure simulation with his original expert report, submitted according to this Court’s prescribed timeline for exchanging expert reports. The model is deeply flawed. Dr. Hill assumes away the possibility of an increase in domestic production of chloride titanium dioxide,<sup>174</sup> and more broadly assumes that North American competitors will not undertake *any* competitive response to production reductions by the combined company.<sup>175</sup> Dr. Hill assumes competitors not only cannot increase production, but: (1) cannot increase capacity; (2) cannot divert their currently substantial exports from North America back to North America in response to a higher relative price in North America; and (3) cannot increase their imports to North

173 [REDACTED]

174 [REDACTED]

175 [REDACTED]

America from other countries.<sup>176</sup> Not surprisingly, by assuming away the possibility of a competitive reaction by rivals, Dr. Hill's model finds it would be profitable for the combined company to reduce output unilaterally.<sup>177</sup> Dr. Hill's outcome-determinative assumptions are unjustified. Running Dr. Hill's capacity-closure simulation while permitting a combined rival response of just [REDACTED] in increased TiO<sub>2</sub> (whether through increased production, imports, or reduced exports) shows that the combined company could not profitably decrease TiO<sub>2</sub> production.<sup>178</sup>

Dr. Hill's second capacity-closure simulation fares no better. Dr. Hill supplied this second simulation twelve days after this Court's deadline for Complaint Counsel to provide Respondents with expert reports. The late-breaking new simulation fundamentally differs from Dr. Hill's original simulation, but does not correct the unjustified and outcome-determinative assumptions of his original model. Those errors persist in Dr. Hill's new capacity-closure simulation, and, without those unjustified assumptions, even his new simulation shows that the combined company cannot profitably reduce output.<sup>179</sup> But the new simulation suffers from new flaws as well. The simulation is demonstrably invalid because it is inconsistent with current supply conditions.<sup>180</sup> That Dr. Hill's simulation predicts present supplier behavior that is fundamentally at odds with the real world reveals its inherent shortcomings and shows it cannot be used to assess the likely

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176 [REDACTED]  
177 [REDACTED]  
178 [REDACTED]  
179 [REDACTED]  
180 [REDACTED]

competitive effects of the transaction.<sup>181</sup> Additionally, inconsistencies in the implementation and predictions of the two versions of Dr. Hill's capacity-closure simulation indicate errors endemic to both the original and new models.<sup>182</sup> Even under Dr. Hill's new model, [REDACTED]

[REDACTED]

[REDACTED]<sup>183</sup>

**4. Past output reduction was a last resort when necessary for legitimate business purposes and had no effect on price.**

Complaint Counsel also asserts that Respondents have historically reduced output in the TiO<sub>2</sub> industry in order to increase price. Nothing could be further than the truth. Historically, Tronox and Cristal have endured extended and severe price declines that have lasted for years at a time, sapping producer profitability. One such global TiO<sub>2</sub> price decline stretched from 2012 to early 2016, driven by reduced demand, de-stocking behavior from customers, and vigorous competition, including increased competition and supply from Chinese TiO<sub>2</sub> producers. TiO<sub>2</sub> producers' prices and margins, including Tronox and Cristal's, dropped sharply during this period.<sup>184</sup> The situation continued to deteriorate from 2015 to 2016, with Tronox experiencing an income loss from operations in each quarter from Q3 2015 to Q2 2016.<sup>185</sup> Cristal suffered even worse results, with a net loss of [REDACTED] million in 2015 and a net loss of [REDACTED] million in 2016.<sup>186</sup>

During this period, Tronox and Cristal were forced to temporarily reduce production in order to sell built-up inventory. Tronox temporarily reduced production as a last resort when TiO<sub>2</sub> prices were falling for dozens of consecutive months, days of inventory were increasing into triple

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181 [REDACTED]  
182 [REDACTED]  
183 [REDACTED]  
184 [REDACTED]  
185 [REDACTED]

186 RX1374 (Resp. of Nat'l Industrialization Co. Pursuant to FTC Req. for Add'l Info. & Documentary Material) at 89.

digits, and profits were plummeting into negative territory. Indeed, at the worst times in the downward cycle, Tronox's financial outlook eerily resembled its condition around the time when it declared bankruptcy. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] These reductions were clearly a last resort because reductions in production are anathema to profitable operation of a TiO2 business, as TiO2 production is a high fixed-cost operation in which profitability depends on full capacity utilization.<sup>189</sup>

Comparing plant utilization rates during this period with price movement shows that curtailing production did not affect plummeting prices. Despite variability in Tronox's production at its Hamilton plant, prices continued to move on an independent, downward trajectory.

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187 [REDACTED]  
188 [REDACTED]  
189 [REDACTED]



If unilateral output reduction could inflate price, output reduction at the Hamilton facility would have been correlated with price recovery. It was not.

Complaint Counsel also points to other instances in which producers have shut down plants as evidence of coordination on output. Again, Complaint Counsel ignores the relevant facts. These closures were rational economic decisions by producers as the plants that were shut down were

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[REDACTED].<sup>191</sup> Investments by TiO<sub>2</sub> producers in increased capacity show that these closures were not part of a tacitly coordinated scheme to reduce output. Indeed, the reduction in capacity from these closures [REDACTED]

[REDACTED].<sup>192</sup> Put simply, TiO<sub>2</sub> price is driven by legitimate supply and demand and other pro-competitive factors,<sup>193</sup> and not tacit coordination among producers on output and price, as Complaint Counsel suggests.

**B. There Is No Coordination In The TiO<sub>2</sub> Market And Post-Transaction Coordination Is Not Likely.**

Contrary to Complaint Counsel’s claims, price coordination does not occur in the TiO<sub>2</sub> market and coordination is not likely as a result of this transaction. Where the government asserts that coordinated effects will be likely post-transaction, the government must prove that such effects are probable. *See Baker Hughes*, 908 F.2d at 984; *see also United States v. Oracle Corp.*, 331 F. Supp. 2d 1098, 1109 (N.D. Cal. 2004) (rejecting Section 7 claim where government failed to prove that market participants “would *likely* engage in coordinated interaction” post merger) (emphasis added). Coordination, at a minimum, “requires harmonizing the incentives of participating firms and mitigating firm uncertainty concerning rival firms, so that they can effectively coordinate their behavior.” *In re B.F. Goodrich Co.*, 1988 WL 1025464, at \*65 (FTC Mar. 15, 1988), *modified by* 1989 WL 1126669 (FTC Apr. 5, 1989). Coordination also requires the ability to successfully enforce the consensus. Firms will not coordinate production or pricing unless they can “retaliate effectively if and when cheating occurs.” *Id.* at \*65; *see also* RX0199 (Aug. 19, 2010 Horizontal

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191 [REDACTED]

192 [REDACTED]

193 [REDACTED]

Merger Guidelines) at § 7 (noting the “ability of rival firms to engage in coordinated conduct depends on the strength and predictability of rivals’ responses to a price change or other competitive initiative.”).

**1. Coordination is not possible because TiO2 prices are individually negotiated with customers and subject to fierce competition.**

Coordination is not possible because TiO2 prices are individually negotiated and customers leverage the fierce competition among TiO2 producers to their advantage to get competitive prices.

There are no “list” prices for TiO2. [REDACTED]

[REDACTED] .194 [REDACTED]

[REDACTED] .195 [REDACTED]

[REDACTED]

[REDACTED]

194 [REDACTED]  
195 [REDACTED]

[REDACTED]<sup>196</sup> [REDACTED]  
[REDACTED]

[REDACTED]<sup>197</sup> These widely used contract provisions leave substantially all of the risk created by fluctuations in TiO<sub>2</sub> prices on the producers, not the customers.

These large and powerful customers are successful in negotiating vigorously to lower prices, and pitting competitors against each other, because producers must keep their plants running “full-out” to maximize profitability. Thus, even small reductions in sales can put severe financial strain on producers.

Ordinary course documents from Respondents and non-parties are replete with instances of TiO<sub>2</sub> producers engaging in intense competition for customers.<sup>198</sup> Competition for Respondents’ business comes not just from “Western” producers—Chemours (formerly DuPont), Venator (formerly Huntsman), and Kronos—but also from other global producers such as Lomon Billions and ISK, as well as other Chinese producers. [REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

**2. Price announcements are a legitimate part of the competitive process.**

Complaint Counsel cites producers’ public price increase announcements, some of which occurred close in time and were similar in amount, as evidence that TiO<sub>2</sub> producers tacitly

196 [REDACTED]  
197 [REDACTED]  
198 [REDACTED]  
199 [REDACTED]  
200 [REDACTED]

coordinate price. In fact, public price increase announcements reflect independent business decisions by TiO2 producers experiencing similar marketplace factors that influence price, such as increasing input costs, higher demand, and other factors. [REDACTED]

[REDACTED]

[REDACTED]<sup>201</sup>

Additionally, the mere fact that a producer *announces* a price increase is no guarantee of how much the *actual* price will increase (if at all), because increases are dependent on supply and demand conditions and competition in the marketplace.<sup>202</sup> [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]<sup>203</sup> Furthermore, price increase announcements do not provide accurate information regarding TiO2 producers' price levels. A price increase, even if fully implemented, is insufficient to show actual price, because producers do not know their competitors' price levels before the price increase.<sup>204</sup>

Furthermore, price increase announcements are necessary because many TiO2 supply agreements contain price protection clauses, which prevent suppliers from increasing prices without at least 90-days' notice in most cases. Price increase announcements serve as notice under these clauses.<sup>205</sup> While some producers historically made their price increase announcements public, several producers, including Tronox and Cristal, no longer do so.

201 [REDACTED]  
202 [REDACTED]  
203 [REDACTED]  
204 [REDACTED]  
205 [REDACTED]

Finally, Complaint Counsel misconstrues Respondents' internal documents showing the tracking of competitors' price increase announcements and earnings calls as evidence of coordination. Rather than showing coordination, these documents reflect the pro-competitive desire of Respondents to compete vigorously with other producers on price and better plan in the face of the uncertain supply and demand conditions in the TiO2 industry—as shown, these conditions can have a significant effect on Respondents' businesses.<sup>206</sup>

**3. Customers have countervailing buying power, often qualifying multiple producers and leveraging them against one another.**

The competitiveness of the TiO2 market is intensified by the countervailing buying power of TiO2 customers. TiO2 customers obtain lower prices by soliciting multiple bids for purchases, qualifying multiple suppliers for the same applications, leveraging producers against one another, and qualifying new suppliers. For instance, in just one example of producer competition for a single customer, Cristal ' [REDACTED] [REDACTED] ' with RPM International, a major paint and coatings customer.<sup>207</sup> And as explained by Sherwin-Williams, one of the largest TiO2 buyers in the world, [REDACTED] [REDACTED].<sup>208</sup> TiO2 producers must take threats by customers to switch volumes seriously, as even the loss of small amounts of volume can lead to significant ramifications for TiO2 producers given the high fixed-cost nature of operating TiO2 plants and the consequent financial imperative to keep plants running full-out.

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206 [REDACTED]

207 [REDACTED]

208 [REDACTED]

TiO<sub>2</sub> customers also flex their buying power by sponsoring entry and expansion. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] The countervailing buying power of customers is only growing stronger, as evidenced by recent consolidation amongst Respondents' downstream customers.<sup>210</sup>

Customers can insulate themselves from the volatility of the TiO<sub>2</sub> price cycle by stockpiling product, which further exacerbates price volatility for TiO<sub>2</sub> producers. To hedge against variance in TiO<sub>2</sub> prices over time, and because TiO<sub>2</sub> is easily shipped and can be stored for long periods without spoilage, customers will often buy excess TiO<sub>2</sub> to store as inventory in anticipation of price peaks. When customers sense demand is waning, they “de-stock,” or start releasing their TiO<sub>2</sub> inventories, and stop buying TiO<sub>2</sub>, which sends price on a downward cascade.<sup>211</sup>

In sum, customers' countervailing buying power also shows the competitive vitality of the TiO<sub>2</sub> market, which makes Complaint Counsel's coordination theory all the more implausible when tested against the realities of the TiO<sub>2</sub> marketplace.

**4. TiO<sub>2</sub> suppliers have different incentives and cost structures, which makes coordination extremely difficult and highly unlikely.**

Each producer's incentives are unique to its particular circumstances, making aligning those incentives through coordination difficult or impossible. Although TiO<sub>2</sub> producers sell similar products, their methods and the costs of producing TiO<sub>2</sub> products differ dramatically from

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<sup>209</sup> RX0229 (Dec. 15, 2015 PPG Press Release, “PPG Begins Using Chloride-Based TiO<sub>2</sub> from Henan Billions in Coatings Production”) at 1.

<sup>210</sup> [REDACTED]

<sup>211</sup> [REDACTED]

producer to producer. Specifically, TiO<sub>2</sub> producers have a diversity of (1) cost positions and (2) scales of operations, such as capacity and production. This wide diversity of incentives among competing producers, both globally and within North America, frustrates the ability of competitors even to reach terms of agreement for a coordinated scheme, much less to monitor performance under or enforce any agreement.<sup>212</sup>

The cost of producing TiO<sub>2</sub> differs substantially across producers, as well as across different plants operated by any given producer. As a result, each producer has a different optimal price for a given product, so any one price is unlikely to satisfy the interests of each competitor.<sup>213</sup> These cost points are also quite volatile, requiring individual producers to adjust price regularly to account for changing costs. The degree to which producers are sensitive to shifts in different types of costs varies widely from producer to producer. Even if suppliers could reach an agreement on pricing or volume despite their wildly different costs of production, such an agreement would need to be renegotiated frequently to adjust for substantial changes in costs to produce, which themselves differ across producers, further frustrating any possibility of maintaining coordination on price or volume. As relative costs differ over time and change in the way they differ over time, coordination would be frustrated by the inability to establish and frequently reestablish “mutually agreeable” price points. Coordination would therefore require an extraordinary level of organization and regular communication between suppliers to be sustainable, making it nearly impossible.<sup>214</sup>

In addition, monitoring whether other competitors were complying with any agreement would be very difficult given the customer-specific, negotiated nature of TiO<sub>2</sub> contract and spot

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pricing and the lack of transparency regarding production decisions. TiO<sub>2</sub> pricing is not published. Rather, TiO<sub>2</sub> pricing is the result of individualized negotiations between a producer and a customer, and the price of a given product at a given time is a function of a multitude of factors, *supra* at 51. As a result, even within a single producer, there might be dozens of price points to different customers for a given product at any given time. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED].<sup>215</sup>

Similarly, an agreement on output would be extremely difficult to monitor. For example, no producer can monitor Chemours because Chemours can significantly adjust its output without adding or closing a production line or taking other steps that would indicate publicly a change in output. In order to increase output, Chemours could increase its use of high-grade feedstock and this would be opaque to the other suppliers in the industry. [REDACTED]

[REDACTED]

[REDACTED]

Finally, enforcement of a coordinated agreement would be frustrated by the inability of higher-cost producers to discourage cheating by lower-cost producers. Different cost points would make it difficult for higher-cost producers to punish lower-cost producers for deviating from coordination prices or volumes, because they could not earn sufficient margins to do so. Chemours, for example, has consistently had significantly lower costs compared to other suppliers since 2012.<sup>217</sup> Chemours' proprietary chloride ilmenite technology gives it more flexibility to

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215 [REDACTED]

216 [REDACTED]

217 [REDACTED]

RX1514 (TZML. "TiO<sub>2</sub> Pigment Producers Comparative Cost & Profitability Study." 2017) at 107

switch between feedstocks and use lower-cost feedstock, and its unique waste solutions further lower its costs, enough to make its costs [REDACTED] lower than the next-lowest-cost producer in 2016. In times of lower relative demand, Chemours would have an incentive to undercut any coordinated prices to gain volume, knowing that its competitors would be unable to retaliate without pricing below cost, an unsustainable strategy. Chemours's ability and incentives in this regard are unaffected by the transaction.<sup>218</sup>

#### 5. The TiO<sub>2</sub> industry does not evidence past coordination.

Observed competitive outcomes are inconsistent with tacit coordination, with respect to both pricing and output. While price trends over time follow general changes in customer demand relative to supply, as would be expected in any competitive marketplace, individual customer pricing varies from customer to customer and supplier to supplier and does not reflect parallel pricing behavior. For example, from 2015 to 2016, Chemours's average TiO<sub>2</sub> price stayed almost flat while other suppliers' prices fell by at least [REDACTED]. Output among TiO<sub>2</sub> suppliers changes significantly over time as some suppliers expand capacity while others contract, and suppliers' rates of capacity utilization is similarly varied.<sup>219</sup>

Bidding may give the appearance of parallel pricing behavior, but the process for buying and selling TiO<sub>2</sub> products is fiercely competitive. As discussed above, prices are negotiated between individual customers and producers, and customers often qualify multiple suppliers and solicit multiple bids in an effort to obtain the best pricing and terms for TiO<sub>2</sub> purchases. As part of this in-depth negotiation process, customers may choose to share or withhold as much or as little information about competitors' prices and terms of sale as they deem advantageous to their cause. So while it may appear that TiO<sub>2</sub> pricing is transparent, that transparency is an illusion

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<sup>218</sup> [REDACTED]

<sup>219</sup> [REDACTED]

controlled by customers with decades of experience as sophisticated and skilled negotiators. The final negotiated price for any given product to a given customer is a product of a multitude of factors that are unique to that customer-supplier relationship.<sup>220</sup> The *Guidelines* note that a “market typically is more vulnerable to coordinated conduct if each competitively important firm’s significant competitive initiatives can be *promptly and confidently observed by that firm’s rivals*[, which] is more likely to be the case if the terms offered to customers are relatively transparent.”<sup>221</sup> The requisite transparency to deem a market vulnerable to coordinated conduct under the *Guidelines* is not present here, and observed outcomes bear that out.

As discussed above, individual TiO<sub>2</sub> producers do announce planned price increases from time to time, which are sometimes, but not always, followed by announcements from other producers, but price announcements are merely announcements and do not reliably result in price changes or uniform price movements. Just as customers individually negotiate pricing, they individually negotiate the timing and degree of price changes, even changes that are publicly announced. So, for example, Cristal may announce a price increase of four cents per pound, but it may only be able to implement a two-cent increase with one customer to take effect in three months, a one-cent increase with another customer to take effect in one month, and no increase with another customer, all following the same price increase announcement. While the price change announcements are sometimes public, the true implemented price changes are known only to the customer and supplier involved in the negotiation. Price increase negotiations also serve to reopen negotiations on other terms of sale, such as discounts and rebates, so even an implemented price increase may be offset by an additional discount or volume incentive, or by an extended

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<sup>220</sup> [REDACTED]

<sup>221</sup> RX0199 (Aug. 19, 2010 Horizontal Merger Guidelines) at § 7.2 (emphasis added).

delay in implementation as the result of a price protection clause or shrewd negotiation. [REDACTED]

[REDACTED]

[REDACTED]<sup>222</sup>

Similarly, suppliers' behavior regarding output and plant capacity is inconsistent with tacit coordination. Examples of suppliers closing plants that Complaint Counsel argues indicate a coordinated attempt to curtail output are really examples of attempts to lower the overall cost of production by shuttering high cost, outdated, or obsolete assets, such as Chemours's Edge Moor plant, which was the company's highest cost TiO<sub>2</sub> production facility at the time it closed in 2015. In addition, such closures are more than offset by close-in-time and ongoing investments in debottlenecking, line additions and de novo capacity construction, as well as in the decisions to optimize supply globally through international trade. All of these efforts to lower cost and/or increase capacity are manifestations of the vigorous competition that exists in the TiO<sub>2</sub> industry, contrary to Complaint Counsel's view of the industry as one already suffering from coordinated affects. Appreciating this demonstrated vigor of pre-merger competition both informs the understanding and evaluation of historical data and illuminates the continuing competitive constraints that will be faced by a combined Tronox-Cristal post-merger.<sup>223</sup>

The varied incentives and cost structures of suppliers in the TiO<sub>2</sub> industry, as well as the lack of transparency in the industry regarding pricing and output, make any potential effort to coordinate pricing or production behavior extremely difficult to set up, monitor, and enforce. As a result of these disparate incentives, observed behavior of TiO<sub>2</sub> suppliers with regard to pricing and production is inconsistent with coordination. By expanding capacity, lowering the

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<sup>222</sup> [REDACTED]

<sup>223</sup> [REDACTED]

costs of production and expansion, and increasing the extent of vertical integration, the proposed transaction creates even greater diversity in incentives and further reduces transparency in the cost structure and incentives of the post-transaction entity.<sup>224</sup>

**6. Civil lawsuits alleging price fixing among TiO<sub>2</sub> producers are irrelevant and do not support Complaint Counsel's coordinated effects theory.**

The Complaint, Dr. Hill's expert report, and Complaint Counsel's brief misleadingly and incorrectly point to two civil antitrust cases, *Valspar v. E.I. Du Pont De Nemours & Co.*, 873 F.3d 185 (3d Cir. 2017), and *In re Titanium Dioxide Antitrust Litig.*, 959 F. Supp. 2d 799, 823 (D. Md. 2013), as evidence of coordination in the TiO<sub>2</sub> industry.<sup>225</sup> The passages on which Complaint Counsel relies are not holdings on coordinated effects in the TiO<sub>2</sub> industry. In *In re Titanium Dioxide*, Complaint Counsel's quoted language merely describes a disputed issue of material fact that made summary judgment inappropriate on coordinated effects, hardly surprising where the case depended on circumstantial evidence that required a jury to weigh. 959 F. Supp. 2d at 823. In *Valspar*, the United States Court of Appeals for the Third Circuit actually held that the record was *insufficient* to support the inference that TiO<sub>2</sub> suppliers were coordinating prices. 873 F.3d at 202. Moreover, to the extent these cases described any evidence of coordinated pricing, that information is long out of date. The conduct at issue took place more than a decade ago, and since that time, there have been transformative changes in the industry, including the end of the information exchange that plaintiffs claimed enabled the alleged anticompetitive conduct and an increase in Chinese competition.

- a. The civil litigation decisions do not support Complaint Counsel's claims.

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22; FTC Pre-Trial Br., 1, 24-25, 28, 30; [REDACTED]

The *Horizontal Merger Guidelines* state that “[t]he Agencies presume that market conditions are conducive to coordinated interaction if firms representing a substantial share in the relevant market appear to have previously *engaged in express collusion* affecting the relevant market, unless competitive conditions in the market have since changed significantly.”<sup>226</sup> None of the court opinions from these litigations supports the conclusion that TiO<sub>2</sub> producers “have previously engaged in express collusion . . . .”<sup>227</sup> The court decisions in the *Valspar* case specifically reject such an interpretation, granting summary judgment in favor of DuPont and concluding that no reasonable jury could find “express collusion” in the industry.<sup>228</sup> Furthermore, the earlier *In re Titanium Dioxide* decision merely concludes, upon crediting all inferences in favor of the plaintiffs, that a jury would need to determine whether or not there was a conspiracy to raise TiO<sub>2</sub> prices during the class period. Given the *In re Titanium Dioxide* court’s generous standard for plaintiffs, it does not follow that the district court’s decision denying summary judgment in *In re Titanium Dioxide* is evidence that TiO<sub>2</sub> manufacturers engaged in express collusion. In fact, the court specifically noted that there was no direct evidence of an express agreement.<sup>229</sup> Therefore, the decisions fall far short of establishing that there has been past collusion in the industry.

Second, in light of the legal standards discussed in the decisions, each court was faced only with the question of whether a jury could infer a conspiracy when the alleged behavior was equally consistent with legal oligopolistic behavior.<sup>230</sup> The courts were not asked to rule on whether, under

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<sup>226</sup> RX0199 (Aug. 19, 2010 Horizontal Merger Guidelines) at § 7.2 (emphasis added).

<sup>227</sup> *Id.*

<sup>228</sup> *Valspar Corp. v. E.I. Du Pont De Nemours*, 152 F. Supp. 3d 234, 250, 252 (D. Del. 2016), *aff’d*, 873 F.3d 185 (3d Cir. 2017).

<sup>229</sup> RX1395 (Aug. 14, 2013 Mem. Op., *In re Titanium Dioxide Antitrust Litig.*) at 3.

<sup>230</sup> *See, e.g., Valspar*, 873 F.3d at 191 (“§ 1 applies only when there is an *agreement* to restrain trade; so a single firm’s independent action, no matter how anticompetitive its am, does not implicate § 1.”) (emphasis in original).

the analysis set forth in the *Horizontal Merger Guidelines*, there was tacitly coordinated pricing or production action among TiO<sub>2</sub> producers. Therefore, conclusions that the industry behaved as an uncompetitive oligopoly are dicta.<sup>231</sup> Furthermore, such dicta is not persuasive because it does not fully address the substantial record of competition among TiO<sub>2</sub> producers that existed in the record.<sup>232</sup>

Complaint Counsel's improper use of the courts' decisions is exposed in their assertion that "[a]s the Third Circuit explained in *Valspar*, this competitive dynamic is already leading to higher TiO<sub>2</sub> prices."<sup>233</sup> Complaint Counsel's statement misleads this Court in at least two respects. First, as evident from the language Complaint Counsel quotes from the opinion, the court was merely observing that "*Valspar presents evidence* that there was 'a . . . overcharge.'"<sup>234</sup> No court made a factual finding that Valspar's assertion was correct, as Complaint Counsel would have this Court believe. Second, had the district court not granted summary judgment, defendants were prepared to show that when Valspar's unreliable overcharge model was adjusted to properly account for defendants' costs and international trade flows, the purported "overcharge" disappeared.<sup>235</sup> Complaint Counsel's misleading description of the Third Circuit's decision highlights why the court must focus on the factual record in *this proceeding* and not on irrelevant dicta from decisions in civil litigation concerning alleged conduct from long ago.

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<sup>231</sup> See, e.g., *Powell v. Thomas*, 643 F.3d 1300, 1304–05 (11th Cir. 2011) ("As we've said, dicta is defined as those portions of an opinion that are 'not necessary to deciding the case then before us,' whereas holding is comprised both of the result of the case and 'those portions of the opinion necessary to that result by which we are bound.')" (quoting *United States v. Kaley*, 579 F.3d 1246, 1253 n.10 (11th Cir. 2009)).

<sup>232</sup> See, e.g., [REDACTED]

<sup>233</sup> FTC Pre-Trial Brief at 4.

<sup>234</sup> *Id.* at 4 n.10 (quoting *Valspar*, 873 F.3d at 197).

<sup>235</sup> [REDACTED]

b. The record from the civil litigation is outdated.

The *Guidelines* instruct that previous engagement in express collusion is not relevant if “competitive conditions in the market have since changed significantly.”<sup>236</sup> The civil litigations concentrated on conduct that began in 2001 through 2003 with the creation of an aggregated production and sales statistics program developed through the Titanium Dioxide Manufacturers Association (“TDMA”), a European trade association.<sup>237</sup> That program involved the blind aggregation of producer production, inventory, and sales volumes on a confidential basis trade association employees, and the dissemination of the aggregated information to members of the TDMA.<sup>238</sup> The plaintiffs alleged that this statistics program helped TiO<sub>2</sub> producers coordinate public price increase announcements. While the *In re Titanium Dioxide* district court found this evidence sufficient for the plaintiffs to reach a jury on whether there was a conspiracy to fix prices, the Third Circuit disagreed, noting that there was nothing nefarious about the statistics program. Nevertheless, the TDMA members ceased the statistics program in 2013.<sup>239</sup> Accordingly, a key feature of the coordination allegations in the civil price-fixing cases is no longer applicable.

In addition, as discussed in Section V, the substantial increases in Chinese-based production capacity, quality, and increased acceptance of Chinese-based TiO<sub>2</sub> by U.S. customers was only beginning to gain momentum at the end of the relevant period for the civil litigations.<sup>240</sup> There were no allegations in the civil cases that U.S. producers were coordinating TiO<sub>2</sub> prices with Chinese-based producers. Accordingly, for all the reasons discussed in Section V, these

<sup>236</sup> RX0199 (Aug. 19, 2010 Horizontal Merger Guidelines) at § 7.2.

<sup>237</sup> [REDACTED]

<sup>238</sup> *See Valspar*, 152 F. Supp. 3d at 238, 245.

<sup>239</sup> [REDACTED]

<sup>240</sup> *Valspar*, 873 F.3d at 190 (“Valspar claims the conspiracy ended in late 2013 when DuPont exited the TDMA.”); [REDACTED]

changed circumstances render the existence of these civil lawsuits, and the court’s discussion of the plaintiffs’ claims, irrelevant in this proceeding.

c. Dr. Hill’s opinions about the civil litigation are unsupported.

Dr. Hill argues that the decisions from these civil lawsuits show [REDACTED]

[REDACTED]<sup>241</sup> He further opines that [REDACTED]

[REDACTED]<sup>242</sup> These opinions are not supported by the litigation record.

First, in support of his opinion, Dr. Hill cites Section 7.2 of the *Horizontal Merger Guidelines*.<sup>243</sup> But, as discussed above, none of the court opinions from these litigations supports the conclusion that TiO<sub>2</sub> producers “have previously engaged in express collusion . . . .”<sup>244</sup>

In addition, Dr. Hill fails to address the record in the litigations. Dr. Hill’s opinions are unsupported by any citation to the record in those cases. Furthermore, he fails to address the substantial evidence of competition from the litigation record.<sup>245</sup> Accordingly, Dr. Hill’s opinions are unsupported and unreliable.

**CONCLUSION**

For the foregoing reasons, judgment should be entered in Respondents’ favor.

Dated: May 11, 2018

Respectfully Submitted By:

<sup>241</sup> [REDACTED]

<sup>242</sup> [REDACTED]

<sup>243</sup> [REDACTED]

<sup>244</sup> RX0199 (Aug. 19, 2010 Horizontal Merger Guidelines) at § 7.2.

<sup>245</sup> See, e.g., RX1021 (Apr. 10, 2015 Cristal Am. Answer & Countercl.); [REDACTED]

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**CERTIFICATE FOR ELECTRONIC FILING**

I certify that the electronic copy sent to the Secretary of the Commission is a true and correct copy of the paper original and that I possess a paper original of the signed document that is available for review by the parties and the adjudicator.

May 16, 2018

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