UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

FEDERAL TRADE COMMISSION, Plaintiff, v. **TRONOX LIMITED *et al.***, Defendants.	Case No. 1:18-cv-01622 (TNM)

MEMORANDUM OPINION*

Last year, two of the world's largest titanium dioxide ("TiO2") producers announced their intent to merge. Tronox Limited agreed to acquire the National Titanium Dioxide Company's TiO2 business, known as "Cristal," for $1.67 billion in cash and a 24% equity stake in the combined firm. Believing that the acquisition would likely violate federal antitrust laws, the Federal Trade Commission issued an administrative complaint challenging the deal.

TiO2 is a pigment used to add whiteness, brightness, and opacity to products like paints, plastics, and paper. It is manufactured by subjecting raw titanium ores to either a chloride or a sulfate production process. Chloride-process TiO2 comprises nearly all the pigment sold in the United States and Canada. The FTC believes that the Tronox-Cristal merger will significantly reduce competition for chloride TiO2 in these two countries, a combined market referred to herein and by the parties as "North America."

Following discovery and briefing by the parties, the FTC's Administrative Law Judge ("ALJ") held a month-long trial to determine the legality of the proposed transaction. The trial recently concluded, and the ALJ will soon issue an initial decision. That ruling is reviewable by

* The Memorandum Opinion was issued under seal on September 5, 2018. This version contains redactions of confidential and competitively sensitive information. The Court has also made minor modifications, citing to publicly available, rather than confidential, information where appropriate.

the FTC's Commissioners, and a federal appeals court may in turn review the agency's final decision.

The transaction has now received conditional or final approval from the FTC's counterparts in the European Union, China, Saudi Arabia, and elsewhere. The Commission therefore seeks a preliminary injunction under Section 13(b) of the Federal Trade Commission Act to prevent Tronox and Cristal from consummating the merger until the agency's review process and any later judicial proceedings have concluded.

The Court finds that the FTC has met its burden under Section 13(b). It has shown a likelihood that the proposed transaction will substantially lessen competition for chloride-process TiO2 in North America, and it has shown that issuing a preliminary injunction is in the public interest. The Court will therefore grant the Commission's motion for preliminary injunctive relief.

I. BACKGROUND

A. The Titanium Dioxide Industry

Titanium dioxide is commercially available in two crystalline structures: anatase and rutile. Anatase is used in textiles, cosmetics, pharmaceuticals, and food, while rutile is typically used in architectural and industrial paints and plastics. PX5000-013.[1] Cristal estimates that roughly 60% of all titanium dioxide produced worldwide is used in paints and coatings, while the rest is used in plastics, paper, and various other applications. *Id.* at 018. Rutile is thus the predominant form of TiO2; anatase accounts for only 10% of global production. *Id*. at 013.

The sulfate production process can create either anatase or rutile TiO2. PX5000-016. It

[1] The FTC's exhibits are identified by a "PX" followed by the exhibit number and a page number. The Defendants' exhibits use "RX" followed by the exhibit and page numbers.

involves dissolving naturally occurring titanium ores (the "feedstock") into sulfuric acid to separate the titanium from other impurities in the ore. *Id*. The sulfate process relies on simpler technology than the chloride process, requires less skilled labor, and, because it produces TiO2 in batches, does not require an uninterrupted power supply. *Id*. Roughly half of all TiO2 made globally is produced using the sulfate process. PX5000-017. China accounts for the largest single-nation share of sulfate-process TiO2, producing 1.67 million metric tons in 2016. *Id*.

The chloride production process can only create rutile TiO2, and it involves using chlorine gas to produce titanium tetrachloride, which is then oxidized to produce TiO2. PX5000-015. The chloride process is continuous, so it requires an uninterrupted power supply. PX3011-013. Compared to sulfate, chloride tends to produce a higher grade TiO2 pigment, features lower conversion and labor costs, and results in less waste. *Id*. The process requires a highly skilled labor force, and its "superior technology" is "closely guarded by Western producers." PX3011-019. In 2016, 99% of the TiO2 produced in the United States and Canada was made using the chloride process. PX5000-016. By contrast, in Europe, only 39% of all TiO2 manufactured was produced using chloride. *Id*.

Customers and suppliers generally agree that there are noticeable differences between chloride- and sulfate-process TiO2. A 2015 Tronox presentation notes, for example, that the chloride pigment is "bluer in tone than sulfate pigment," which has a "more yellow tone of white." PX1322-003. Dr. Paul Malichky, the Director of Raw Material Sourcing at PPG, a major multinational paints and coatings company, explained that while "both would appear white if you physically looked at them," in a final product (like a can of white paint) with "two colors, one with a chloride and one with a sulfate, the color would be different." Hr'g Tr. 100:6-13. *See also* PX7020-013 (George Young, a senior executive at Sherwin-Williams, another major paint

company, stating that "sulfate grade is not as bright a white as a chloride. It doesn't deliver the same physical performance as a chloride.").

Chloride TiO2 can also be more durable than its sulfate counterpart. Sulfate has "impurities that come as part of the process; most specifically, iron . . . [which] decreases the durability." Hr'g Tr. 100:14-19. Chloride-process TiO2 products feature "better durability, scrubability, and various other performance characteristics." Hr'g Tr. 169:19. And, because of "the [consumer] preference for whiteness and durability, sulfate grades are not widely preferred for applications that have prolonged outdoor exposure." PX8005-002.

Titanium dioxide is generally sold to customers in two formulations: "dry" and "slurry." PX5000-017. Dry TiO2 is sold in a powdered form typically packaged in bags; slurry TiO2 is dry titanium dioxide combined with an aqueous solution. *Id.* While most TiO2 sold globally is dry, large North American paint companies prefer slurry. PX0001-030.

B. The Competitive Landscape

The titanium dioxide market has been described as an "oligopoly," as TiO2 is a "commodity-like product with no substitutes, the market is dominated by a handful of firms, and there are substantial barriers to entry." *Valspar Corp. v. E.I. Du Pont De Nemours and Co.*, 873 F.3d 185, 190 (3d Cir. 2017). Jeffry Quinn, the CEO of Tronox, explained that there are "dozens and dozens of competitors worldwide, but there are really six companies that often are referred to as sort of the global TiO2 producers or the global companies." Hr'g Tr. 585:9-11. These firms are Chemours, Tronox, Cristal, Kronos, Venator, and Lomon Billions. *Id.* at 585:13-586:2.

Of the six, the first five dominate the production of chloride TiO2. PX1532-051. In 2016, roughly 2.77 million metric tons of the pigment was produced globally. *Id.* Chemours, the world's largest TiO2 firm, accounted for about 37% of 2016 chloride production capacity.

PX5000-021. With Chemours, Cristal (21%), Tronox (15%), Kronos (13%), and Venator (7%), together accounted for 93% of total chloride production capacity. *Id*. Based on this data, the proposed transaction would result in two firms, Chemours and the Tronox-Cristal entity, that control nearly three-quarters of the global chloride TiO2 supply.

Chinese manufacturers control around 51% of global sulfate production capacity. *Id*. Sulfate production is more dispersed than chloride. Lomon Billions is China's largest TiO2 firm, and in 2016 it accounted for 13% of global supply. *Id*. A smattering of other Chinese firms had roughly 38%, while domestically, Venator (12%) and Kronos (4%) are also significant producers of sulfate TiO2. *Id*.

The paint and coatings industry is the largest overall consumer of titanium dioxide, and PPG, Sherwin-Williams, RPM, and Masco (Behr) are among the largest paint producers. *See* PX9020-009; PX5000 at 18, 044-045. Representatives from these firms, other paint and plastics manufacturers, and Chemours, Tronox, Cristal, Kronos, and Venator provided testimonial and documentary evidence about the TiO2 market during the administrative proceedings before the Commission. Additionally, Dr. Malichky (PPG), Mr. Christian (Kronos), Mr. Quinn (Tronox), and the parties' economic experts (Dr. Nicholas Hill for the Commission and Dr. Ramsey Shehadeh for the Defendants) testified about the market and the proposed merger during a three-day evidentiary hearing here.

C. History of Proceedings in This Case

On December 5, 2017, the Commissioners of the FTC voted 2-0 to authorize the filing of an administrative complaint to block the Tronox-Cristal transaction, as they found reason to believe that it would violate Section 7 of the Clayton Act, 15 U.S.C. § 18. The Commissioners'

vote also authorized the FTC to seek a temporary restraining order ("TRO") and preliminary injunction against the merger in federal district court.

After several months of discovery, the ALJ held an administrative trial from May 18 to June 22, 2018. The parties filed post-trial briefs, proposed findings of fact, and proposed conclusions of law with the ALJ last month. They will offer closing statements to him once briefing has concluded. His resulting decision may be reviewed by the Commission and potentially, an appellate court.

On July 10, 2018, the FTC petitioned this Court for a TRO and a preliminary injunction to halt a potential closing of the deal. The Commission explained that "[a]bsent such provisional relief, Tronox and Cristal . . . will likely be free to consummate the merger as soon as July 16, 2018, the earliest date it appears the European Commission ("EC") is likely to complete its [antitrust regulatory review] process by approving" remedies to mitigate the deal's anticompetitive effects in Europe. Compl. 2. Approval from the EC was "the only remaining hurdle preventing Defendants from consummating the Acquisition." *Id.*

Three days later, the Court held a hearing on the Commission's TRO motion. Following that hearing, the parties stipulated that Tronox and Cristal would not seek to consummate the proposed transaction until four business days after the Court decided the Commission's request for a preliminary injunction. *See* Ex. A (Agreement Not to Close Transaction) 2, ECF No. 44-1.

On August 7, 2018, the Court began a three-day evidentiary hearing on the FTC's motion for injunctive relief. The Commission proposed that the hearing proceed with oral arguments based solely on the closed evidentiary record before the ALJ. *See* Pl.'s Proposed Hr'g Schedule 2, ECF No. 45. The Defendants objected, ultimately proposing that each side be allowed to

present live testimony from two expert witnesses and a fact witness. *See* Defs.' Proposed Hr'g Schedule 4, ECF No. 47. The Court allowed each side to present live testimony from three witnesses of their choosing, and to present opening and closing arguments.[2] The parties also submitted briefs outlining their positions and the complete administrative record before the ALJ.

II. LEGAL STANDARDS

Section 7 of the Clayton Act prohibits acquisitions "the effect of [which] may be substantially to lessen competition, or to tend to create a monopoly" in "any line of commerce or in any activity affecting commerce in any section of the country." 15 U.S.C. § 18. If the FTC has reason to believe "that a corporation is violating, or is about to violate, Section 7 of the Clayton Act, [it] may seek a preliminary injunction to prevent a merger pending the Commission's administrative adjudication of the merger's legality." *F.T.C. v. H.J. Heinz Co.*, 246 F.3d 708, 714 (D.C. Cir. 2001). Section 13(b) of the Federal Trade Commission Act authorizes district courts to grant a preliminary injunction where "such action would be in the public interest—as determined by a weighing of the equities and a consideration of the Commission's likelihood of success on the merits." *Id*.; *see* 15 U.S.C. § 53(b).

For relief under Section 13(b), the Commission must establish that "there is a reasonable probability that the challenged transaction will substantially impair competition." *F.T.C. v. Staples Inc.*, 190 F. Supp. 3d 100, 114 (D.D.C. 2016). Congress "intended this standard to depart from what it regarded as the then-traditional equity standard, which it characterized as requiring the plaintiff to show: (1) irreparable damage, (2) probability of success on the merits and (3) a balance of equities favoring the plaintiff." *Heinz*, 246 F.3d at 714. The FTC is "not

[2] The Defendants ultimately elected to call only two witnesses, as they were running low on time under the parties' agreed-upon "chess clock" system. *See* Hr'g Tr. 581:3-9.

held to the high thresholds applicable where private parties seek interim restraining orders," and Section 13(b) instead creates a "unique public interest standard . . . rather than the more stringent, traditional equity standard for injunctive relief." *Id*. (cleaned up).

The public interest standard requires courts to "measure the probability that, after an administrative hearing on the merits, the Commission will succeed in proving that the effect of the [proposed transaction] may be substantially to lessen competition" in violation of the Clayton Act. *F.T.C. v. Sysco Corp.*, 113 F. Supp. 3d 1, 22 (D.D.C. 2015). The Commission meets this standard if it "has raised questions going to the merits so serious, substantial, difficult and doubtful as to make them fair ground for thorough investigation, study, deliberation and determination by the FTC in the first instance and ultimately by the Court of Appeals." *Id*. at 23 (citing *Heinz*, 246 F.3d at 714-15).

To determine the Commission's likelihood of success on the merits, the Court applies the burden-shifting framework established by *United States v. Baker Hughes, Inc.*, 908 F.2d 981, 982-93 (D.C. Cir. 1990). First, the FTC must show that the Tronox-Cristal merger will lead to "undue concentration in the market for a particular product in a particular geographic area." *Id*. at 982. The Commission thus bears the initial burden of (1) defining the appropriate product market, (2) defining the appropriate geographic market, and (3) showing that the merger will lead to undue concentration in the relevant product and geographic market. *See F.T.C. v. Arch Coal, Inc.*, 329 F. Supp. 2d 109, 117 (D.D.C. 2004). Such a showing establishes a presumption that the merger will substantially lessen competition. *Baker Hughes*, 908 F.2d at 982.

The Defendants can rebut this presumption by showing that the Commission's "prima facie case inaccurately predicts the [merger's] probable effect on future competition." *Id*. at 991. If the Defendants make this showing, the burden of producing further evidence of

anticompetitive effects shifts back to the government. *Id*. at 983. The "ultimate burden of persuasion . . . remains with the government at all times." *Id*. In evaluating either party's evidence, "antitrust theory and speculation cannot trump facts." *Arch Coal*, 329 F. Supp. 2d at 116.

In addition to evaluating the Commission's prima facie case and any rebuttal evidence proffered by the Defendants, the Court must also weigh the equities involved. The "public interest in effective enforcement of the antitrust laws is of primary importance," and "a showing of likely success on the merits will presumptively warrant an injunction." *Arch Coal*, 329 F. Supp. 2d at 116. If, on the other hand, the FTC cannot show a likelihood of success on the merits, "equities alone will not justify an injunction." *Id*.

III. ANALYSIS

A. The FTC has Established a Presumption of Anticompetitive Effects

The Commission has shown a likelihood that Tronox's acquisition of Cristal's titanium dioxide business will substantially impair market competition. It has demonstrated that the relevant market should be defined as the chloride-process TiO2 sold in North America. The FTC's evidence credibly suggests that the merger will greatly increase concentration in an already concentrated market, and that it will create incentives for the remaining industry participants to engage in strategic withholding of TiO2 supplies to maintain higher prices.

1. Chloride-Process Titanium Dioxide is the Relevant Product Market

A market's "outer boundaries" are determined by the "reasonable interchangeability of use or the cross-elasticity of demand between the product itself and substitutes for it." *Brown Shoe Co. v. United States*, 370 U.S. 294, 325 (1962). Within this market, however, "well-defined submarkets may exist which, in themselves, constitute product markets for antitrust

purposes." *Id*. The appropriate submarket can be identified "by examining such practical indicia as industry or public recognition of the submarket as a separate economic entity, the product's peculiar characteristics and uses, unique production facilities, distinct customers, distinct prices, sensitivity to price changes, and specialized vendors." *Id.* "[E]vidence of industry or public recognition of the submarket as a separate economic unit matters because we assume that economic actors usually have accurate perceptions of economic realities." *United States v. H & R Block, Inc.*, 833 F. Supp. 2d 36, 53 (D.D.C. 2011).

The Defendants contend that the market, properly defined, includes both chloride- and sulfate-process TiO2, but the Commission believes the correct market includes only the former. Both the economic realities of the industry, as described by TiO2 producers and consumers, and the evidence presented by the expert economists show that the FTC has carried its burden.

a. Producers and Consumers View Chloride TiO2 as a Separate Product, and the Expert Evidence Supports this View

Manufacturers of titanium dioxide consistently recognize the existence of a chloride TiO2 submarket in North America. In 2014, for example, Tronox's Content Communications Manager emailed then-CEO Tom Casey talking points ahead of a town hall meeting. PX1427. The talking points convey that, unlike sulfate, "[c]hloride process uses higher-quality feedstocks and makes better-quality TiO2" and that "[s]ubstitution in US/Europe not likely." *Id* at 003. A 2015 Tronox presentation notes that the "North American market is ~90% chloride. There is no sulfate production (except a small plant in Canada, Kronos). Limited imports." PX1322-003. At the evidentiary hearing, Tronox CEO Jeffry Quinn[3] conceded that "the way things have

[3] Mr. Quinn's testimony was credible, and he gave candid responses even when they were not necessarily helpful to the Defendants. Though he has been on Tronox's board of directors for several years, Mr. Quinn only became Tronox's CEO in December 2017. Because he was not actively involved in the daily

developed here in the U.S. is as a chloride market." Hr'g Tr. 641:17-19. He added that chloride TiO2 uses a different manufacturing process, is "viewed as more environmentally friendly, and it has – so I think it's a different product." Hr'g Tr. 648:18-21.

Mr. Christian,[4] from the Defendants' competitor Kronos, similarly testified that chloride TiO2's "brighter, more reflective white" and its "better durability, scrubability, and various other performance characteristics" when compared to sulfate TiO2 make it a "higher-quality product that [is] preferred, all things being equal, by the customers." Hr'g Tr. 169:10-20. Kronos's chloride TiO2 products "are more environmentally friendly . . . have a lower cost structure, and . . . command higher prices in the marketplace." Hr'g Tr. 174:18-21. Consistent with this view, other TiO2 suppliers distinguish between their chloride- and sulfate-process TiO2 products.[5]

Like suppliers, customers recognize a submarket for chloride-process TiO2, reflecting the product's particular traits and uses. Dr. Malichky[6] testified that chloride and sulfate TiO2 are "not substitutable on a color basis" and that if "you don't want [a paint product] to degrade or

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management of Tronox before then, his capacity to offer insights into the TiO2 industry was somewhat limited.

[4] During the evidentiary hearing, Mr. Christian provided testimony on Kronos's TiO2 production and on his views about the TiO2 industry and competitive landscape. The Court credited his testimony; he gave thoughtful answers and did not appear to have a preferred outcome about the proposed transaction. He provided good perspectives and insights into an industry supplier's viewpoint, although his understanding of the customers' perspective was necessarily limited.

[5] *See, e.g.*, PX5000-043 (describing a Cristal email stating that "[w]hat we really would like to avoid is to accept that T595 [a chloride pigment] could be compared to a low sulphate [sic] quality product."); PX9121 at 007 (Chemours 2017 10-K) ("Our portfolio of premium performance TiO2 pigment grades provides end-users with benefits beyond opacity, such as longer-lasting performance, brighter colors, and the brilliant whites achievable only through chloride-manufactured pigment.").

[6] During the evidentiary hearing, counsel for Tronox advised that the Court should be "wary of self-serving statements by customers." Hr'g Tr. 64:10-16. When Dr. Malichky made statements revealing self-serving interests, the Court weighed his assertions in that context. Generally, the Court credited Dr. Malichky's statements if they appeared to track the perspectives offered by other TiO2 consumers and industry participants, as evidenced by documents in the record.

fade" the product would "require chloride." Hr'g Tr. 100:12-19. Masco, maker of Behr paints, adds that the "ultra pure white feature" of its paints is "[e]xtremely important" for the firm's brand, and that "to achieve that [feature], we need to use TiO2 produced based on the chloride process." Admin. Trial Tr. 972:16-973:20.[7]

In fact, customers do not substitute away from chloride TiO2 even when prices are "very high" or when sulfate prices have "been as much as [redacted] cheaper than chloride TiO2." *See* PX8001-002; PX8003-003. [redacted] reported that, "[e]xcept for our traffic marking paint, we have not used sulfate TiO2 in our products in North America even though sulfate grades generally are less expensive than chloride grades." PX8003-003. Switching from chloride to sulfate TiO2 involves "[t]housands of hours" of labor due to the complexities associated with color-matching and product reformulation (*i.e.*, ensuring that paint colors made with chloride TiO2 are not visibly different from the colors as made with sulfate TiO2). Hr'g Tr. 104:14-105:6.

The Defendants suggest that the market is not so black and white. "Chloride-process TiO2 *can* be used interchangeably with sulfate-process TiO2 in the vast majority of end-use applications," they argue, and consumers "regularly *try* to leverage sulfate-process TiO2 prices in negotiations with suppliers about chloride-process TiO2." Defs.' Redacted Opp. to Prelim. Inj. 11, ECF No. 70 (emphasis added). But the relevant question concerns not just the hypothetical possibility of substitution, but whether customers do in fact exhibit a willingness to substitute chloride- and sulfate-process TiO2. *See Arch Coal*, 329 F. Supp. 2d at 119.

[7] *See also* PX8001-002 (statement from [redacted] noting that the firm "only uses chloride grade titanium dioxide. [redacted]"); PX5000-045 (collecting similar statements from customers like [redacted] and [redacted]).

Compare the market perspectives discussed above with those offered by the consumers in *Arch Coal*. There, the court considered how much utilities companies substitute between two types of coal – 8800 Btu and 8400 Btu. It found that "virtually all the utilities acknowledged that they can and do purchase and consume both 8800 and 8400 Btu coal, and that they actively solicit and consider both in their coal bidding procedures." *Id*. at 121. Customers testified that their facilities "were designed to burn, and have burned" both types of coal, that they "purchased both 8400 and 8800 coal in the past five years" and that managers "purchase 8400 to 8800 Btu coal depending on which coal has the best evaluated price." *Id*. at 121-22. The court thus concluded that the "evidence of significant interchangeability" between 8800 and 8400 Btu coal, combined with a "reluctance of [the FTC's] own expert to conclude that 8800 Btu coal is a separate relevant market," meant that the Commission failed to carry its burden of establishing its proffered product market. *Id*. at 122-23.

Here, the Commission has sufficiently shown a relevant product market. The evidence from customers and suppliers suggests a lack of significant interchangeability between chloride and sulfate TiO2. And the report and testimony of the Commission's expert economist, Dr. Hill, bolster this evidence.[8]

Using producer invoices and data published by the International Trade Commission and the United Nations, Dr. Hill evaluated price trends for chloride and sulfate TiO2. He found that,

[8] Dr. Hill has a doctorate in economics from Johns Hopkins University, and serves as a partner at Bates White, an economic consulting firm. As one of the FTC's three witnesses during the evidentiary hearing, Dr. Hill provided his own analysis and opinions. He also served as a summary witness of sorts, enabling the Commission to highlight relevant aspects of the extensive administrative record. The Court found his testimony and report to be credible. But his models and the conclusions they suggest are susceptible to some valid critiques. So while the Court found them ultimately consistent with the other evidence presented, his analysis was not dispositive on either the relevant market or the likelihood that the merger will increase market concentration.

from 2012 to 2017, "chloride titanium dioxide was on average $532 per ton, or 21 percent, more expensive than sulfate titanium dioxide." PX5000-046. Yet, despite this price premium for chloride TiO2, "the proportion of sales accounted for by chloride titanium dioxide has held steady [in North America]." *Id*. The existence of distinct prices and a consistent market share for chloride TiO2 are "not what one would expect if North American customers were willing and able to substitute one type of titanium dioxide for another in response to a change in their relative prices." *Id*.

b. The Defendants' Product Market Counterarguments are Unavailing

Dr. Shehadeh, the Defendants' expert, attacked Dr. Hill's findings, countering that "[e]conomically significant co-movement between prices for chloride-produced TiO2 and prices for sulfate-produced TiO2 establishes a single market" for the two products. RX0170.0143.[9] Using data from Cristal, Venator, and Kronos, Dr. Shehadeh showed "the correlation between and co-integration of monthly chloride and sulfate TiO2 prices for" the three firms from 2010 to 2017. *Id*. at 0144-46. This price correlation, according to Dr. Shehadeh, suggests that chloride and sulfate TiO2 are substitutable.

But the mere fact that the prices of two goods move upward or downward together need not mean that they are substitutes. As Dr. Hill explained during the evidentiary hearing, "If you think about the sale of hamburger buns and hot dog buns, their prices will be highly correlated. Their demands are both seasonal—high in the summer, low in other seasons—and they're made

[9] Dr. Shehadeh has a PhD in economics from Cornell and is a managing director at NERA, an economic consulting firm. He too both summarized his modeling and synthesized his side's key evidence during the evidentiary hearing. The Court found Dr. Shehadeh's testimony and analysis to be entitled to some weight but ultimately unconvincing on several key points.

with the same ingredients. So their prices will be highly correlated. But they're not close substitutes for each other." Hr'g Tr. 407:24-408:4.

Price correlation between the two types of TiO2 may reflect changes in feedstock prices, or a correlation in the demand for different types of paints (like low-end traffic marking paint, which tends to use sulfate TiO2, and high-end exterior home paint, which uses the chloride pigment). In other words, "rather than high cross-elasticity of demand, correlated price movements might reflect the similar responses of different markets to similar changes, as when all prices move up in response to changes in common costs." 2B Phillip E. Areeda & Herbert Hovenkamp, *Antitrust Law* ¶ 534c (4th ed. 2014) ("Areeda & Hovenkamp").[10]

The Defendants raise two additional arguments. *First*, they note that "[a]pproximately 80% of TiO2 end-use products can be made with either sulfate- or chloride-process TiO2 [and] only 10% of products are more compatible with one process or the other." Defs.' Redacted Opp. To Prelim. Inj. 12. But for antitrust purposes, the "[r]elevant market analysis is based on the narrowest market principle." *Arch Coal*, 329 F. Supp. 2d at 120. This principle holds that, because "a relevant market cannot meaningfully encompass an infinite range of products," it must be "drawn narrowly to exclude any other product to which, within reasonable variations in price, only a limited number of buyers will turn." *Sysco*, 113 F. Supp. 3d at 26.

So, even if only 10% of the products that use titanium dioxide are more compatible with chloride-process TiO2 than the sulfate alternative, the firms manufacturing that 10% can

[10] Reflecting their limitations as an approach to defining markets, Dr. Jonathan Baker, a former director of the FTC's Bureau of Economics and Chief Economist at the Federal Communications Commission concluded that "price correlation tests contain little or no information relevant to the issue of antitrust market definition." Jonathan B. Baker, *Why Price Correlations Do Not Define Antitrust Markets* 7, Fed. Trade Comm'n Working Paper No. 149 (1987). *See also* Gregory J. Werden and Luke Froeb, *Correlation, Causality, and All that Jazz: The Inherent Shortcomings of Price Tests for Antitrust Market Delineation*, 8 Rev. of Indus. Org. 329, 332-338 (1993) (highlighting some problems with using price correlation to define antitrust markets).

constitute a relevant antitrust submarket. And here, the evidence suggests a much larger percentage of firms—at least in the relevant geographic market—cannot easily switch from chloride to sulfate. *See, e.g.*, PX5000 at 044-045 (collecting statements from many customers, who suggest, for instance, that for "over 90 percent [of applications] in the U.S., we can't switch between chloride and sulfate" and "[u]sing sulfate TiO2 would compromise our end products in North America, which is something we are not willing to do.").

Second, the Defendants identify two examples of individual chloride-process TiO2 products competing with sulfate-process products. *See* Defs.' Unredacted Opp. to Prelim. Inj. 13, ECF No. 68-3. They note that "[o]ne of Tronox's leading chloride-process grades, CR-828, competes directly with R-996, a sulfate-process grade of TiO2 manufactured by Chinese producer Lomon Billions," and that another Tronox product, "[redacted], has lost business to sulfate-process TiO2 from Chinese producers." *Id.* These statements, however, provide no indication of sales volumes or the context or extent to which the two chloride-process products have competed with their sulfate alternatives.

"Whatever the market urged by the [FTC], the other party can usually contend plausibly that something relevant was left out, that too much was included, or that dividing lines between inclusion and exclusion were arbitrary." Areeda & Hovenkamp at ¶ 530d. "The Supreme Court has wisely recognized there is 'some artificiality' in any boundaries, but that 'such fuzziness' is inherent in bounding any market." *Id.* (citing *United States v. Philadelphia Nat'l Bank*, 374 U.S. 321, 359 n.36 & 360 n.37 (1963)). Isolated examples of potential substitutability simply do not outweigh the consistent testimony and representations of industry participants or the empirical evidence provided by Dr. Hill. Thus, for the purposes of a preliminary injunction, the FTC has shown that the relevant product market is limited to chloride-process titanium dioxide.

2. "North America" is the Relevant Geographic Market

a. Industry Participants Believe that Distinct Regional Markets Exist

Like the product market, the relevant geographic market must "correspond to the commercial realities of the industry and be economically significant." *Brown Shoe Co.*, 370 U.S. at 336. It encompasses the "area to which consumers can practically turn for alternative sources of the product and in which the antitrust defendants face competition." *F.T.C. v. Cardinal Health, Inc.*, 12 F. Supp. 2d 34, 49 (D.D.C. 1998). Recall that in defining a market for antitrust purposes, the narrowest market principle applies. [11] While the Defendants believe that the relevant market is global, the Commission contends that it should be limited to the United States and Canada.

Here too, the statements of titanium dioxide suppliers are instructive. On a 2014 earnings call, then-Tronox CEO Tom Casey asked, "are there different prices in the regional markets in which we do business? The answer to that question is yes. The European and Asian market prices and the Latin American market prices are relatively closely bunched, with the North American price being somewhat higher." PX9008-008. On another earnings call in 2016, Mr. Casey expressed Tronox's view "that prices in Europe and in Asia were lower than prices in the United States and in other North American – the other North American markets." PX9001-007. Ian Mouland, Tronox's vice president of sales for the Americas, suggested in an internal email that a customer "need[s] to stop being concerned about regional price differences and accept that regions are different . . . unless he is telling you that [he] sell[s] a can of paint in Mexico for the same price as in Germany?!" PX1085-001. Tronox acknowledged that TiO2 pricing "depends

[11] The Defendants have not suggested that the relevant market should be any narrower than the FTC's proposal.

upon the region . . . [redacted]." PX7001-032.

Like Tronox, the other major producers segment their customers by location. Kronos has "a European region . . . [a]nd then we have North America, which represents the United States and Canada. And then we have [LatAm], which is Latin America, Central America, the Caribbean, and South America. And then the export market, which is for us rest of world." Hr'g Tr. 167:22-168:7. [redacted] "separates customer locations into five different regions: North America (United States and Canada); Europe, the Middle East, and Africa; Asia-Pacific excluding China; China; and Latin America (including Mexico)." PX8004-002. [redacted] explained that "customers in the North American region generally have different requirements than in other regions." *Id.* *See also* PX5000-062 (featuring similar statements from Cristal representatives).

Titanium dioxide customers also acknowledge the existence of a distinct North American TiO2 markets. Sherwin-Williams paints "have different pallets in different regions of the world," and customer demands require that the company has "different performance standards around the world as well." PX7020-014. The firm has thus found that "sulfate has not been suitable for our formulations in North America [but in] other regions of the world with different quality standards, there has [sic] been levels of suitability." Admin Trial Tr. 642:25-643:3. Dr. Malichky testified that "[i]n PPG jargon, we would call [the North American market] USCA, U.S. and Canada, and Mexico is different. The suppliers consider Mexico different, as well." Hr'g Tr. 97:17-19. He added that, for the North American market, "[t]he vast majority [of TiO2 PPG uses] is chloride," but that "in Europe, we use more sulfate." Hr'g Tr. 101:16-18; 103:17-20.

b. Quantitative Evidence and the Hypothetical Monopolist Test Further Support Treating North America as a Separate Market

The available quantitative evidence also supports the existence of regional TiO2 markets. In a single, global market, sustained regional price variances are unlikely, as customers would engage in arbitrage—like importing TiO2 or purchasing it indirectly from other customers—that equalizes prices over time. *See* U.S. Dep't of Justice & F.T.C. Horizontal Merger Guidelines § 4.2.2 (2010) ("Merger Guidelines"). But by evaluating data from Tronox and Cristal, Dr. Hill showed that, from 2012 to 2017, the average difference in TiO2 prices between North America and the rest of the world ranged from $250 - $525 per metric ton. PX5000 at 063-064.

A recent TiO2 supply restriction in Europe provides more proof of regionalized markets. In January 2017, a fire at a large TiO2 plant in Pori, Finland, decreased the available titanium dioxide in Europe and caused a rapid and significant price increase. PX5004-039. Producer invoice data suggest that, before the fire, North American TiO2 prices were roughly $200 - $250 per metric ton higher than European prices. After the fire, however, European prices significantly exceeded those in North America. From January to October 2017, Cristal's and Tronox's European prices each rose by [redacted] (compared to [redacted] and [redacted] increases in North America respectively). *Id*. The Pori fire thus shows a dramatic relative increase in European prices not "disciplined by customer arbitrage." *Id*.

Dr. Hill also conducted several iterations of the "hypothetical monopolist test" to prove that the relevant market consists of North American sales of chloride-process TiO2. The test seeks to determine whether a hypothetical company that is the only seller of the relevant product to customers in the relevant geography could profitably impose a "small but significant and non-transitory increase in price" ("SSNIP"). *See* Merger Guidelines §§ 4.1.1; 4.2.2. If this hypothetical monopolist can profit from imposing a SSNIP without losing a critical mass of

customers, then a relevant antitrust market has been defined. If, on the other hand, customers can defeat the price increase "by substitution away from the relevant product or by arbitrage," the market definition must be broadened. *Id*. *See also Sysco*, 113 F. Supp. 3d at 33-34.

To run the test, Dr. Hill conducted a "critical loss analysis." PX5000-049. He began by calculating the "critical loss," which is the percentage of "lost unit sales that would leave profits unchanged" if a hypothetical monopolist imposed a SSNIP. Merger Guidelines § 4.1.3. Dr. Hill determined that, with an SSNIP of 10%, a hypothetical monopolist could lose up to 15.4% of its sales and still break even. PX5000-051. The critical loss threshold is thus 15.4%.

Next, Dr. Hill estimated the "predicted loss" that would be observed in the event of a SSNIP of 10%. If the predicted loss is less than the critical loss, imposing a SSNIP would be profitable for the hypothetical monopolist, and the relevant antitrust market has been correctly defined. Dr. Hill used three methods to calculate the predicted loss: the "price elasticity of demand" method, a "substitution components" method, and a "documentary evidence" method. Each showed that a hypothetical monopolist could profitably raise North American chloride TiO2 prices by 10%. *See* PX5000 at 051-057.

Price elasticity of demand measures the responsiveness of a product's sales to a 1% change in the product's price. PX5000-051. Demand for a product is "elastic" if a 1% price increase decreases demand by more than 1%. It is "inelastic" if a 1% price increase decreases demand by less than 1%. The more inelastic a product's demand, the less likely it is that the product has adequate substitutes. Dr. Hill found that the price elasticity of North American chloride TiO2 is -0.45% (*i.e.*, a 1% increase in price reduces sales by 0.45%). He multiplied this number and a 10% SSNIP to show that the predicted loss of sales, 4.5%, would be considerably lower than the critical loss of 15.4%. PX5000-052. In other words, estimates of price elasticity

show that a hypothetical monopolist could profitably increase North American chloride TiO2 prices by 10%.

Dr. Hill's "substitution components method" used the Defendants' data to estimate the expected increase of TiO2 imports in response to a 10% SSNIP. The TiO2 that firms acquire from imports or from other producers repatriating their exports represents lost sales for a hypothetical monopolist. Dr. Hill found that a 10% SSNIP would lead to roughly 75,000 more metric tons of TiO2 being imported or repatriated, and another 3% decrease in the monopolist's sales of rutile TiO2. PX5000-054. Together, this represents roughly 12.6% of total North American chloride TiO2 sales. *Id*. As a 12.6% loss is lower than the critical loss threshold of 15.4%, the substitution components method predicts that the hypothetical monopolist could profitably raise prices.

Finally, Dr. Hill used data from Tronox documents. At some future point, Tronox contends, "Chinese sulfate could take up to 15 percent of [all TiO2] applications" in North America, thus "reducing the share of chloride titanium dioxide by at most five percent." PX5000-055. Dr. Hill assumed that such sulfate substitution would occur in response to a 10% SSNIP. He and calculated that the resulting loss of sales to the hypothetical monopolist would be about 8.7%, which again is lower than the critical loss threshold. PX5000-056. Based on these calculations and his other analyses, Dr. Hill concluded that the relevant market for evaluating the merger's potential anticompetitive effects consists of North American chloride TiO2 sales.

c. The Defendants Define the Market Too Broadly

The Defendants argue that the Commission's geographic market definition is impermissibly narrow, and they challenge many of Dr. Hill's calculations. The FTC's "claim that the relevant geographic market is limited to North America," they contend, "ignores that

TiO2 is a globally-traded commodity." Defs.' Unredacted Opp. to Prelim. Inj. 8. If Dr. Hill's hypothetical monopolist "were to attempt to implement a SSNIP post-merger, the significant volume of TiO2 'on the water' that would be diverted to North America . . . would exceed the critical loss . . . within the FTC's candidate market." RX0170.0015. This is because global trade in TiO2 is "highly elastic." *Id*.

True, global trade flows of TiO2 are substantial. In 2016, 46% of the chloride TiO2 produced in North America was exported. PX5000-037. The largest producers of the chloride pigment in North America—Chemours, Tronox, and Cristal—are also its largest exporters. *Id*. at 038. Upon a price increase in North America, these producers could conceivably repatriate some of this exported TiO2 to increase their profit margins.

The Commission, however, provided plausible explanations for why sizeable repatriation of titanium dioxide would not occur. First, there has been no evidence of this behavior in the past. As mentioned earlier, Dr. Hill's analysis suggests a persistent variance in prices between North America and other regions. Regional price differences show that profiting from export repatriation is possible. But the persistence of these differences shows that nontrivial repatriation does not happen in practice.

One offered reason is that, in the TiO2 industry, "customer relationships" and "security of supply" are essential. Hr'g Tr. 399:15-22. TiO2 producers have large customers in export markets, and "alienating a customer base" could result in the long-term loss of business. *Id*. As revenues depend on both sales volume and product price, "making a large change invoking the ire of your customers for a short period is probably not worth it." Hr'g Tr. 399:25-400:2. *See also* PX8005-004 (Venator explaining that "[o]ur European business is stable, and our primary focus is on serving the established relationships we have built over time with large customers in

Europe. Given the cost of shipping and duties, we are generally better off selling in Europe than exporting to North America. We have not seen a sustained gap between North American prices and European prices large enough over a long enough period that it would make sense for us to export more to North America.").

The North American preference for slurry rather than dry TiO2 presents another reason to question the extent to which export repatriation might defeat a price hike imposed by the hypothetical monopolist. The "North American market is almost exclusively slurry," and customers in this region have "some of the most strict" quality of product and service demands. Hr'g Tr. 177:21-22; 178:5-11. While all titanium dioxide trading is subject to logistical challenges, import duties, and shipping costs, slurry TiO2 requires at least some additional capital expenditure (such as physical locations at which the dry TiO2 is mixed with an aqueous solution and repackaged). These costs may make export repatriation even more unlikely absent a large and sustained regional price disparity. Together, the persistence of regionalized pricing, the lack of evidence of prior export repatriation, the incentives for maintaining customer relationships and supply security, and the domestic preference for slurry raise significant questions about whether customers could import enough TiO2 to offset a SSNIP.

Aside from ignoring global trade flows, the Defendants contend that the Commission's market definition is wrong because of the "flawed method with which" Dr. Hill implemented the hypothetical monopolist test. RX0170.0129. According to them, Dr. Hill wrongly "gives the hypothetical monopolist control over supply both inside and outside his hypothesized relevant market." *Id.* at 0130. This modeling decision means that "customers in North America could not get additional supply" from plants and producers in Europe or other regions. *Id.*

But an assumption that North American customers will not be able to secure meaningful increases in TiO2 from foreign sources appears to comport with the industry's economic realities as described above. Moreover, the Merger Guidelines suggest that "[w]hen the hypothetical monopolist could discriminate based on customer location, [the Commission] may define geographic markets based on the locations of targeted customers . . . . Geographic markets of this type encompass the region into which sales are made." Merger Guidelines § 4.2.2. Persistent regional pricing shows that TiO2 producers can discriminate based on customers' locations. And, as Dr. Shehadeh testified, the Merger Guidelines are "an excellent summary of a very broad set of tools that are used by economists" to engage in antitrust analysis. Hr'g Tr. 478:6-8. They have also been repeatedly relied on by the courts. *See, e.g.*, *Sysco*, 113 F. Supp. 3d at 38 ("The Merger Guidelines are not binding, but the Court of Appeals and other courts have looked to them for guidance in previous merger cases.") (citing *Heinz*, 246 F.3d at 716; *H & R Block*, 833 F. Supp. 2d at 52 n. 10). Thus, Dr. Hill's modeling assumptions seem reasonable given the nature of the TiO2 industry.

In summary, though the TiO2 market is characterized by considerable global trade, the Commission has credibly suggested that North American customers could not overcome a 10% SSNIP by increasing imports from foreign sources. It has also shown that customers cannot substitute away from chloride by using sulfate TiO2 in their coatings, paints, and plastics. The Court finds that the FTC has carried its burden, and that the market for chloride-process TiO2 in North America is the relevant market in which to assess the potential anticompetitive effects of Tronox's acquisition of Cristal.

3. The Chloride-Process TiO2 Market in North America is Concentrated, and the Proposed Transaction Would Substantially Increase Concentration

Chemours, Cristal, Tronox, Kronos, and Venator dominate the market for chloride-process TiO2 in the United States and Canada. From producer invoices, customer data, and third-party cost studies, Dr. Hill estimates that roughly 831,000 metric tons of chloride TiO2 was sold in North America in 2016. Of this volume, Chemours accounted for [redacted] of sales. Together, Tronox and Cristal accounted for [redacted]. PX5000-068. Kronos accounted for [redacted], and Venator for [redacted], of 2016 sales. *Id*. Together, the five firms sold nearly 99.5% of total chloride TiO2 in 2016, and the proposed merger would create a market in which the top two companies control around 73% of total production capacity.

The Merger Guidelines explain that "[m]arket concentration is often one useful indicator of likely competitive effects of a merger," and that the Herfindahl-Hirschman Index ("HHI") is a common economic measure of such concentration. Merger Guidelines § 5.3. Courts agree. *See, e.g.*, *Heinz*, 246 F.3d at 716.

The HHI is calculated by squaring the market share of each firm in the market and adding up these squares (so, if there are three firms with market shares of 50%, 30%, and 20%, the HHI would be $50^2 + 30^2 + 20^2 = 3{,}800$). Squaring the individual market shares allocates proportionately greater weight to firms with larger shares, reflecting the larger threat to competitive behavior they pose. *See* Merger Guidelines § 5.3. For antitrust purposes, the FTC and the U.S. Department of Justice generally classify markets as "unconcentrated," "moderately concentrated," and "highly concentrated." An unconcentrated market features an HHI of below 1,500. A moderately concentrated market has an HHI of between 1,500 and 2,500, while a highly concentrated market has an HHI that is greater than 2,500. *Id*.

Economists calculate the HHI score of an industry before and after the proposed merger. Transactions that result in an HHI increase of fewer than 100 points "are unlikely to have adverse competitive effects." *Id*. In moderately concentrated markets, a transaction that increases the HHI by more than 100 points "potentially raise[s] significant competitive concerns and often warrant[s] scrutiny." *Id*. Mergers "resulting in highly concentrated markets that involve an increase in the HHI of more than 200 points will be presumed to be likely to enhance market power." *Id*. This presumption of anticompetitive effects "may be rebutted by persuasive evidence showing that the merger is unlikely to enhance market power." *Id*.

The Defendants did not attack Dr. Hill's HHI analysis. He determined that the present-day North American chloride TiO2 market features an HHI score of 2,320, which suggests that the market is moderately concentrated. PX5000-068. Should Tronox and Cristal merge, the new four-firm market would feature an HHI of 3,046. The merger would thus increase the HHI by 726 points, resulting in a highly concentrated market. Because it would increase the HHI score by well over 200 points, and because it would result in a highly concentrated market, the proposed transaction is presumptively anticompetitive under the Merger Guidelines. *See also Heinz*, 246 F.3d at 716 (noting that the proposed merger would "increase the HHI by 510," and that this "creates, by a wide margin, a presumption that the merger will lessen competition" in the relevant market).

4. Post-Merger Strategic Output Withholding is Likely

Beyond its market-share analysis, the Commission's evidence suggests a reasonable probability that the proposed transaction will lead to anticompetitive behavior among the industry's remaining players. Although the Defendants offer nontrivial critiques of Dr. Hill's

theoretical models suggesting this behavior, they cannot overcome the real-world proof of meaningful market incentives to manage prices by withholding TiO2 supply.

a. The Documentary and Testimonial Evidence Points to Incentives for and a History of Strategic Output Withholding

Statements from Tronox executives evince an understanding that TiO2 producers recognize the benefits of strategically withholding supply from consumers to maintain higher prices. In 2012, the firm's Chief Commercial Officer advised against aggressive competition with producers, as this would cause "price to deteriorate further and [Tronox does] not want to facilitate or fuel that process." PX5000-077. He instead suggested the company "slow down production so that we minimize or eliminate the inventory build that will occur if we continue running at the existing rates." *Id*. On a 2015 earnings call, Mr. Casey noted that Tronox was "addressing when the prices turn" by "managing our production so that inventories get reduced to normal or below normal levels. And when that happens, prices will rise." PX9005-010. On a 2016 earnings call, Mr. Casey explained that "a very disciplined approach to production, to managing supply relative to demand, is what has facilitated the recovery in our markets, and we intend to continue to be disciplined about that." PX9003-010. And on the February 2017 earnings call to announce and discuss the proposed merger with Cristal, Mr. Casey said, "we have tried to be economically rational over these last several years. If there was surplus supply in the market we slow down our production." PX9000-012.

Tronox documents suggest the firm has withheld TiO2 supply to shore up prices in the past and that avoiding price competition with fellow suppliers can be beneficial. In 2016, Arjen Duvekot, then a managing director, told a distributer that "to stop the price erosion in the market we reduced the production output in our pigment plants mid 2015 by 15%," adding that this withholding "presents a great opportunity to turn around the price trend of the last 4 years and

improve the prices for Tronox TiO2 pigment in the market." PX5002-009. Similarly, in 2015, Mr. Duvekot told a colleague that offering a consumer a lower price "will cause a reaction from the competition, at this account or elsewhere in the market, which will just lead to more price erosion in the market. Tronox does not want to play this game (anymore)." PX1432-001.

Other TiO2 firms also acknowledge the benefits of strategic output withholding. *See* PX2022, PX2116, and PX2083 (statements in Cristal documents about idling production to raise prices); PX3000 at 003-004 ([redacted] noting that "capacity rationalization" and an "increasingly structured and consolidated market (Tronox / Cristal)" mean that the "[s]ignificant recovery in TiO2 prices [is] expected to continue through 2017 and 2018"); PX5000-079 (describing plans by Chemours to "dial back production" at some plants in response to adding production capacity at a facility in Mexico).

There is, of course, nothing improper about a firm making independent production decisions to maximize profits. But a core purpose of antitrust law is to scrutinize mergers that may make it easier for firms to collectively reduce output, and indeed, to prevent mergers that are likely to do so. *See Heinz*, 246 F.3d at 371 ("Merger law rests upon the theory that, where rivals are few, firms will be able to coordinate their behavior, either by overt collusion or implicit understanding, in order to restrict output and achieve profits above competitive levels."); *F.T.C. v. Elders Grain, Inc.*, 868 F.2d 901, 906 (7th Cir. 1989) (Posner, J.) (noting that antitrust theory "teaches that an acquisition which reduces the number of significant sellers in a market already highly concentrated and prone to collusion by reason of its history and circumstances is unlawful in the absence of special circumstances.").

A Tronox-Cristal merger will make TiO2 supply reductions easier to coordinate through implicit understanding and sheer market power, in a market where producers have already shown

an awareness that implicit coordination would be beneficial.[12] The post-merger market would feature two firms that control roughly three quarters of all chloride TiO2 production – Chemours and the Tronox-Cristal entity. These firms could more easily "stop the price erosion in the market" and "slow down production" across the industry, as customers will often be left with no meaningful alternative sources of supply.

Consider two examples. First, [redacted] "spends about [redacted] annually to buy a specialty chloride grade of titanium dioxide from Tronox." PX8001-001. [redacted] While the firm "prefers to use Tronox's . . . titanium dioxide, it has purchased . . . from [redacted] and [redacted] in the past, and is willing to purchase it [from these Tronox rivals] in the future," based on product pricing and availability. *Id.*

Recently, Tronox offered [redacted] a new "one-year contract at a significant price increase, about [redacted] above" the firm's current contract price. *Id.* at 002. The company "reached out to [redacted] and [redacted], its two previous titanium dioxide suppliers," but "[redacted] responded that they do not have supply to offer, and [redacted] failed to respond at all." *Id.* Seeking to avoid paying Tronox's higher price, the company "anticipate[s] reaching out to Cristal in the near future" to see if Cristal would be willing to offer a supply proposal. *Id.*

Second, [redacted] has a supply agreement with Tronox that [redacted]

[12] The Commission alleges a history of overt collusion in the TiO2 industry, pointing to recent price-fixing allegations and litigation. *See Valspar Corp. v. E.I. Du Pont De Nemours and Co.*, 873 F.3d 185 (3d Cir. 2017); *In re Titanium Dioxide Antitrust Litig.*, 959 F. Supp. 2d 799 (D. Md. 2013); Pl.'s Mem. in Supp. of Pl.'s Mot. for Prelim. Inj. 3, ECF. No. 6 ("the TiO2 industry in North America has a long history of price-fixing litigation and subsequent court decisions outline pervasive anticompetitive conduct."). The Defendants vigorously contest these assertions. *See* Defs.' Redacted Opp. to Prelim. Inj. 28-29. That said, the Court need not decide the merits of these claims, as the proposed merger will increase the likelihood of collective output withholding without explicit agreements or attempted price-fixing.

[redacted]. Seeking to test the TiO2 market for a better deal, [redacted] "approached [redacted], and they said [they have] no volume for 2018. They had none available to sell [redacted]." Hr'g Tr. 276:16-17. When [redacted] "first approached [redacted], they gave us the same answer. [redacted]" Hr'g Tr. 276:18-22. Thus, "if Tronox raised prices, by, say, 10 percent" under present market circumstances, "Cristal would be [the] one person [redacted] could approach." Hr'g Tr. 277:2-5.

The experiences of [redacted] and [redacted] suggest that chloride TiO2 consumers in North America today face challenging but surmountable hurdles in their efforts to negotiate prices and ensure a consistent source of supply. In at least some cases, the threat of switching between Tronox and Cristal is the only leverage available to industry customers. In North America, for instance, [redacted] purchases roughly [redacted] of its TiO2 and [redacted] of its slurry TiO2 from either Tronox or Cristal. Hr'g Tr. 282:18-21. More broadly, Chemours and the Tronox-Cristal entity would often be able to maintain price discipline and control supply in a post-merger market simply by competing less vigorously against each other for major accounts. As Mr. Christian testified, "more consolidation . . . leads to more power for the producers . . . [the proposed merger] gives us increased . . . bargaining power as an industry." Hr'g Tr. 270:5-10.

The available real-world evidence thus suggests that (1) to counter declining prices, chloride TiO2 producers have incentives and the means to withhold supply, and (2) the proposed transaction, which would create two firms with nearly three-quarters of the total market share, will likely increase these incentives and make implicit price coordination easier. The evidence,

in other words, strengthens the Commission's assertion that the Tronox-Cristal merger raises serious and substantial questions about likely anticompetitive effects.

b. Dr. Hill's Capacity Closure and Cournot Models are Subject to Valid Critiques, but Their Conclusions Track Business Realities

Dr. Hill used two economic models to prove that the merger will increase incentives to withhold TiO2 supply. He first presented findings from a new analysis he calls the "Capacity Closure" model. PX5000-085. It seeks to quantify the costs and benefits to the Tronox-Cristal entity associated with output reductions. Generally, the cost of reducing production is the lost profit on each unit of TiO2 that is withheld, while the benefit is the higher profit margin, attributable to a higher market price, of each unit that is sold. *Id*. at 086. The model allows "imports of chloride titanium dioxide to be affected by changes in the price," but it does not "allow for an increase in North American domestic production of chloride titanium dioxide because of the current high operating rates in North America." *Id*. at 087.

The Capacity Closure model predicts that, "under current market conditions, the merged firm would have an incentive to withhold output by idling two production lines at [Tronox's] Hamilton plant [in Mississippi]." *Id*. at 087. Specifically, the "most profitable output withholding strategy is predicted to lead to a price increase of 23% and cause harm of $419 million per year." The model outlines many profitable withholding strategies that would result in price increases to consumers ranging from 8 - 38%. *Id*.

The Defendants present two criticisms of the Capacity Closure model that limit the persuasiveness of its conclusions. Dr. Shehadeh contends that the model is invalid as it "predicts that Chemours should supply less to North America under current competitive conditions than Chemours is actually supplying." RX0170.0038. Because the model's predictions are unreliable

for "Chemours' actual conduct today," he argues, they are unreliable as they pertain to future conduct by the merged entity. *Id*.

Dr. Hill's rebuttal report does not respond directly to this allegation. *See* PX5004 at 041-045. During the evidentiary hearing, he explained that he did not try to address the issue, as he did not apply his model to Chemours. Hr'g Tr. 447:2-448:1. Instead, he claimed that he was unwilling to "rely on the data" used by Dr. Shehadeh, because "Chemours has a different production process than its rivals," and this makes "margin information" on the firm unreliable. *See id.* Dr. Hill did use this data, however, in conducting some of his hypothetical monopolist testing, as there he "was able to mitigate the concerns about the data." Hr'g Tr. 448:5-7. While it is true that data fit for one purpose may not be fit for another, Dr. Hill's response does not fully allay the concerns raised by Dr. Shehadeh, and there is reason to question the model's predictive power.

Dr. Shehadeh also questions the justification for the assumption that the "current high operating rates in North America" mean that producers cannot increase capacity at all. After all, high operating rates do not prevent firms from "engaging in [the type of] expansions that have been so evident in the industry." RX0170.0039. Dr. Hill's rebuttal focuses on statements made by Venator and Chemours executives, who predict sustained capacity constraints and suggest that the industry's high utilization rate is unlikely to change over the next few years. *See* PX5004 at 043-44. But these statements assume that the status quo will continue, and not that a new Tronox-Cristal entity will increase its output withholding. It therefore seems reasonable to expect *some* efforts by rivals to increase capacity if such efforts could be profitable.

Unlike the Capacity Closure model, the Cournot model is a "fundamental economic" tool used to analyze oligopolies. PX5000-090. Its "key insight is that firms in oligopoly markets will

recognize their mutual interdependence and restrict output—thereby increasing the market price above the competitive level." *Id*. And unlike the Capacity Closure method, the Cournot model allows firms to adjust output, so that each firm can expand capacity if it so chooses. *Id*. Dr. Hill's Cournot analysis suggests that "the merger would lead to a higher chloride titanium dioxide price unless the merger were to generate a more than 74% reduction in the merged firm's marginal cost as compared to those of the stand-alone firms." *Id*. Unless the cost savings from the acquisition are so great as to reduce the price of producing a unit of TiO2 pigment by 74%, the Cournot model suggests that the merged entity would gain more from raising prices than increasing supply.

Dr. Shehadeh contends that, in some circumstances, use of the Cournot model is not appropriate and leads to results that are inconsistent with market realities. RX0170.0044. Here, for instance, the Cournot model "significantly" understates the existing marginal costs of production. *Id*. at 0045. Chemours' marginal cost of producing TiO2 is, according to the model, "more than [redacted]" lower than the "actual" marginal cost as measured by Dr. Hill. *Id*. Because of this "glaring inconsistency with basic industry facts," the Cournot model cannot yield reliable conclusions about the market. *Id*.

The Defendants also highlight, and Dr. Hill confirms, that his "Cournot model predicts that in the North American chloride TiO2 market the merger will be unprofitable with respect to variable costs." Hr'g Tr. 450:21-24. He added that he did not use the Cournot model to analyze the overall profitability of the merger, but that a "merger that generates significant fixed cost savings" would still be profitable on an overall basis. Hr'g Tr. 452:18-453:14.

Dr. Hill rejects the contention that these findings make the Cournot model inconsistent with market realities. He counters that Dr. Shehadeh "confused the total cost of production,"

which is used in the Capacity Closure model, with "the concept of marginal cost of production." PX5004-046. Using a corrected, apples-to-apples comparison, the data offers "striking support for the Cournot model's validity." *Id*. Dr. Hill also suggests that the purpose of the Cournot model is not to analyze merger profitability, but rather to test the effects of output withholding. Hr'g Tr. 467:15-24.

The Court finds that Dr. Hill's overall conclusions are more consistent with the business realities of the TiO2 industry than those proffered by Dr. Shehadeh, even if the Cournot and Capacity Closure models are subject to valid criticisms. Dr. Hill buttresses his modeling with several producer statements that support his findings. TiO2 producers are aware, for example, of their interdependence and the downsides of expanding output. *See* PX5000-093 (collecting Tronox executives' statements like, "we have not gained market share by trying to reduce price [and we] don't think that's the appropriate strategy going forward," and [redacted]. These statements lend credibility to the models' conclusions, as they suggest that firms are generally unwilling to take actions that will lower industry-wide prices.

Ultimately, this Court need not decisively sift through various models and theories. *See Sysco*, 113 F. Supp. at 36-37 (noting that the court "hesitates to rely on" an expert's precise calculations where such calculations are subject to valid criticism, and concluding that "when evaluated against the record as a whole, [the expert's] conclusions are more consistent with the business realities" of the relevant market). Rather, the question here is whether the FTC "has raised questions going to the merits so serious, substantial, difficult and doubtful as to make them fair ground for thorough investigation, study, deliberation and determination by the FTC in

the first instance and ultimately by the Court of Appeals." *Heinz*, 246 F.3d at 714-15 (internal quotation omitted).

The FTC clears this bar. It has established its prima facie case by proving that the Tronox-Cristal merger will likely result in undue concentration in the North American chloride-process TiO2 market. It has strengthened this case by showing that the merger will increase already prevalent incentives to engage in strategic output withholding. The Commission has therefore established a presumption that the proposed transaction will have anticompetitive effects in violation of the Clayton Act.

B. The Defendants' Rebuttal Evidence Does Not Overcome the Presumption of Anticompetitive Effects

The Defendants can rebut the presumption that their merger will substantially lessen competition either by "discrediting the data underlying the initial presumption in the government's favor," or by "affirmatively showing why [the deal] is unlikely to substantially lessen competition." *Baker Hughes*, 908 F.2d at 991. Generally, "[t]he more compelling the [FTC's] prima facie case, the more evidence [the Defendants] must present to rebut it successfully." *Id*. As discussed above, the Defendants have not sufficiently discredited the Commission's data and evidence.

They marshal two additional arguments suggesting that the market will remain competitive post-acquisition. First, they contend that the current market is "fiercely competitive," and that the Defendants face increased pressure from "the rise of Chinese market entrants who are disrupting competition globally." Defs.' Unredacted Opp. to Prelim. Inj. 24, 29. Second, they assert that consumers will benefit from the transaction's output-enhancing synergies and efficiencies. Neither argument, alone nor in tandem, can overcome the Commission's strong presumption of anticompetitive effects.

1. Chinese Producers are Not Yet Positioned to Replace the Competition That Would be Lost by a Tronox-Cristal Merger

Entry or expansion into the relevant market by new competitors can mitigate the expected anticompetitive effects of a proposed transaction. *H & R Block*, 833 F. Supp. 2d at 73. This is because, "[i]n the absence of significant barriers, a company probably cannot maintain supracompetitive pricing for any length of time." *Baker Hughes*, 908 F.2d at 987. The Merger Guidelines thus suggest that companies that are "not current producers in a relevant market, but that would very likely provide rapid supply responses with direct competitive impact in the event of a SSNIP, without incurring significant sunk costs, are also considered market participants." Merger Guidelines § 5.1. Sunk costs include the "entry or exit costs that cannot be recovered outside the relevant market." *Id*.

The Defendants contend that, in defining the market and assessing the deal's likely harm, the Commission "wrongly dismisses the importance of Chinese TiO2 producers, particularly Lomon Billions, the fourth largest TiO2 supplier in the world by capacity." Defs.' Unredacted Opp. to Prelim. Inj. 30. Lomon Billions "plans to expand its chloride capacity . . . by adding 200,000 tons per year during the year 2019 . . . and 300,000 tons per year sometime in the mid-2020s." *Id*. at 30-31. Based on 2016 data, this expansion would make Lomon Billions almost twice as large as the current market leader in chloride-process production (Chemours, with roughly 290,000 tons), and would expand the overall chloride market by nearly 60%. *See* PX5000-068. Lomon's bold growth plan is feasible, "real and unspeculative," the Defendants warn, because the firm "benefit[s] from low capital costs, support from the Chinese government, and from inherited intellectual property." Defs.' Unredacted Opp. to Prelim. Inj. 30-31.

It is no doubt possible, and perhaps inevitable, that competition from Lomon Billions and other Chinese TiO2 producers will someday redefine the North American market. But the

pertinent question here is whether the emergence of Lomon Billions can be "rapid enough to make unprofitable overall the [predicted] actions" that otherwise lead to the Commission's concerns about anticompetitive effects. Merger Guidelines § 9.1. The evidence suggests that it cannot.

Currently, neither Lomon Billions nor any supplier other than Chemours, Tronox, Cristal, Kronos, or Venator account for even 1% of North American chloride-process TiO2 supply. PX5000-068. Lomon Billions, like other Chinese firms, is "predominantly" a sulfate-process TiO2 producer. Hr'g Tr. 184:9-11. Tronox documents from 2016 suggest that "China has built multiple chloride plants but struggles to commission them," and that "almost no commercial grade [chloride] pigment is produced today." PX5000-113.

Major TiO2 manufacturers do not appear to be worried about the prospect of a near-term increase in Chinese chloride production. In a 2015 email, then-Tronox CEO Mr. Casey said, "I think it is a very remote prospect that China will be producing chloride capacity of any magnitude in the next 3-5 years. The only facility is a 30,000 ton plant being built by Billions, which they cannot get to work." PX1065-001.

Similarly, from Kronos's perspective, Lomon Billions is "just not a material threat today . . . . We've been thinking [about] this for a while, [and] we just don't see a lots [sic] of Chinese [chloride-process] products in the markets in which we compete." Hr'g Tr. 183:24-184:8. Kronos does not see its "customers . . . switching from our [chloride-process] products to Lomon Billions." Hr'g Tr. 184:16-17. As Mr. Christian persuasively explained, Chinese companies' typical advantages are low labor costs and a relaxed environmental regulatory regime. Hr'g Tr. 186:11-25. These advantages are of little help in the chloride-process business. *Id*.

Indeed, the experiences of Chinese TiO2 manufacturers confirm the existence of two substantial barriers rendering rapid entry into the North American market unlikely: capital costs and technology constraints. Tronox estimates that "on average, the greenfield cost per ton of TiO2 is between $5,000-$6,000 for chloride pigment plants." PX003-013. The construction of a new 200,000-ton plant would therefore cost between $1-$1.2 billion. *See also* PX5000-110 (noting similar estimates from Cristal and Kronos).

In addition to high entry costs, chloride-process TiO2 requires advanced technology and intellectual property that is "closely guarded by Western producers." PX3011-019. Lomon Billions has "struggled with the technology. They don't produce utilization rates anywhere near their . . . nameplate capacity [and] they've had to lower the nameplate capacity of their plant." Hr'g Tr. 184:23-185:3. *See also* PX5000-113 ("[redacted] deemed efforts by the largest Chinese producer, Lomon Billions, to produce chloride titanium dioxide a 'technology failure."); PX1000-018 (Tronox presentation noting that the "[l]egitimacy of [Chinese] base technology [is] questionable," and that Chinese firms have "[n]o know-how/experience of running CP plant").

Customers, like TiO2 producers, believe that technology and quality constraints preclude Chinese manufacturers from meaningful participation in the chloride market. [redacted] has tested Lomon Billions' chloride TiO2 but found it lacking. PX5000-114. [redacted] has an established supply relationship with Lomon Billions, but they "weren't able to deliver the material that we ordered when we wanted it." [redacted] *See also* Admin. Trial Tr. 1094:21-1095:9 (North American customer noting that buying "titanium dioxide from China" would "really be a last resort for us.").

Finally, even if Chinese producers can radically increase their chloride TiO2 production over the next few years, recent trends show that much of this supply may be consumed by their

domestic demand. China is currently a net importer of chloride TiO2. PX5000-115. As its economy grows and per capita incomes increase, demand for household paints and other products using TiO2 is expected to rise. An industry study, for example, estimates that China's share of TiO2 demand will "expand[] from 4% of global demand in 2005 to an anticipated share of 27% in 2020." PX5000-115. [redacted] *See also* PX3032 at 001 ("Chinese TiO2 growth is primarily feeding local and Asian demand."). Reflecting these trends, Mr. Casey estimated that China's "first production [of chloride TiO2] will go into the domestic market so the export market impact will be quite a while." PX1065-001.

The limited presence of Lomon Billions in the North American chloride market today, the substantial barriers to entry, and China's internal TiO2 demand trends do not paint a picture of rapid entrants ready to replace the loss of Cristal as a source of competition. Rather, the emerging threat from Chinese producers here is like the prospective competition from Amazon that the court considered in *Staples*, 190 F. Supp. 3d at 133-136. Evaluating a proposed merger between Staples and Office Depot, the court there found that the Commission had established its prima facie case. *See id*. at 131. The *Staples* defendants responded by suggesting that competition from "Amazon Business" would nullify any suggested anticompetitive effects. *Id*. at 133. They asserted that Amazon "wants to take over the office supply industry," and that the firm would "eventually transform the [business-to-business] office supply space." *Id*.

The court was unconvinced. It found "significant institutional and structural challenges" that prevented Amazon from being "in a position to restore [lost] competition." *Id*. at 134. The court found that "customers still do not view Amazon Business as a viable alternative," and that

Amazon had "yet to successfully bid to be a large [business-to-business] customer's primary vendor." *Id*. Amazon, in other words, would "not be in a position to compete" in the relevant market "with the proposed merged entity within three years." *Id*. at 136. So too here. Lomon Billions is not yet positioned to compete meaningfully with the producers that would remain in a post-merger North American chloride TiO2 market.

2. The Transaction's Purported Synergies and Efficiencies do not Rebut the Commission's Prima Facie Case

When a court "finds high market concentration levels, defendants must present proof of extraordinary efficiencies to rebut the government's prima facie case." *Sysco*, 113 F. Supp. 3d at 81. Courts have "rarely, if ever, denied a preliminary injunction solely based on the likely efficiencies." *Id*. at 82 (quoting *F.T.C. v. CCC Holdings, Inc.*, 605 F. Supp. 2d. 26, 72 (D.D.C. 2009)). To be able to offset a merger's likely anticompetitive effects, purported synergies and efficiencies must "represent more than mere speculation and promises about post-merger behavior." *Heinz*, 246 F.3d at 721. They must be "merger-specific," meaning that they "cannot be achieved by either company alone." *Id*. at 721-722. And they must be "reasonably verifiable by an independent party." *H & R Block*, 833 F. Supp. 2d at 89. The Defendants have identified several merger-specific, but ultimately unverifiable, synergies and efficiencies.

The Tronox-Cristal merger, they argue, will increase global production of TiO2 for three reasons. First, "Tronox produces more TiO2 feedstock than its TiO2 pigment plants can consume, while Cristal's TiO2 production exceeds its feedstock production." Defs.' Unredacted Opp. to Prelim. Inj. 24. The merger would thus allow "greater vertical integration" leading to expanded TiO2 output. *Id*. Second, Tronox believes that Cristal is not producing as much TiO2 as it could, in part because of the "extremely subpar" performance of its titanium dioxide plant in Yanbu, Saudi Arabia. *Id*. at 27. Kerr McGee, Tronox's predecessor firm, "built Yanbu with its

own technology," and Tronox believes it has a "unique skill set" and expertise that will allow it to boost production at the plant. *Id*. (emphasis in original). Third, Tronox believes that it can "repair and restart" the "Jazan slagger," a currently non-operational feedstock-producing facility in Saudi Arabia that is owned by Cristal. *Id*. Such repairs would increase the available feedstock for TiO2, thereby increasing the pigment's production. And an increase in global TiO2 production will, all else equal, benefit consumers by lowering prices.

Although the Court does not doubt their desire to operationalize these efficiency-improving plans, the Defendants have not shown that the merger will necessarily increase overall output. As discussed above, the titanium dioxide industry features significant incentives, depending on prices, to withhold or manage output to maximize profits. The Defendants contend that the "great opportunity costs" associated with reducing TiO2 production mean that "TiO2 manufacturers, when they have their facility, they run it flat out, they run it all out, they try to gain . . . 100 percent realization." Hr'g Tr. 40:25-41:3. But this assertion is belied by the observable economic reality of the industry: to prevent falling prices, firms can and do find it profitable to reduce output.

Still more, the success of Tronox's planned improvements to the Yanbu plant and Jazan slagger cannot be reasonably verified before such improvements occur. TiO2 plants, Tronox CEO Jeffry Quinn explained, are "like living organisms. You make mistakes. You do things, and sometimes it doesn't work." Hr'g Tr. 603:13-15. He added that the Jazan slagger has "had several failed start-ups in the past." Hr'g Tr. 618:21.

Reflecting this uncertainty, Tronox signed an Option Agreement with Cristal related to the slagger. The Option Agreement "obligated [Tronox] to make financial investments to help fix the Jazan facility," and "if certain performance metrics are met," Tronox is "obligated to

purchase [the slagger] in the future." Hr'g Tr. 619:8-19. But if these performance metrics are not met, then "the $120 million that we are advancing, gets converted to a loan, either we get paid back or that we get it paid back in terms of a reduced price for buying feedstocks to come out of the furnace." Hr'g Tr. 620:5-12. Tronox, in other words, has taken understandable precautions in case the planned output-enhancing improvements cannot be actualized.

The Defendants also suggest that the merger will result in "sizeable cost savings synergies" stemming from the "reduction in personnel" and "supply chain synergies, including volume purchase discounts." Defs.' Unredacted Opp. to Prelim. Inj. 28-29. The Defendants hired KPMG, a professional services company, "to verify the synergy estimates." *Id*. at 29. After "performing [an] extensive review of the Tronox and Cristal transaction, with access to the 'entire data room' in this matter," KPMG submitted a report showing that they "had assessed and validated" the deal's cost savings. *Id*.

Again, while the Court credits the intent to achieve these cost savings, it is difficult to independently verify the scale or likely success of the deal's synergies. In measuring the general administrative cost savings of the deal, for instance, KPMG's "synergy tracking model" relied in part on revised estimates of operational synergies "that the business had identified." PX7045-013. KPMG's conclusions on cost savings were thus partially based on estimates and assumptions made by the Defendants' internal business teams.

Nor did Defendants hire KPMG to identify "merger-specific" cost savings for antitrust purposes, but to "provide consulting support" for the "sign-to-close period" of the deal. *Id*. at 012. It is thus difficult to evaluate and compare the deal's synergies to the dollar amount of cost savings that may have been achievable by either Tronox or Cristal absent a merger. *See Sysco*, 113 F. Supp. 3d at 83 ("Sysco did not hire McKinsey to identify merger-specific savings for

antitrust purposes . . . . McKinsey was not given instructions on identifying merger-specific savings." As a result, "Defendants have not shown that [the cost savings] could not be achieved independently of the merger.")

In sum, neither emerging competition from Chinese producers nor the transaction's purported synergies and efficiencies sufficiently prove that the Tronox-Cristal merger will in fact be pro-competitive. The Court finds that the FTC has met its burden by raising "questions going to the merits so serious, substantial, difficult and doubtful" as to warrant further proceedings by the FTC and, potentially, the Court of Appeals. *Heinz*, 246 F.3d at 714-715.

C. The Equities Favor Granting the Commission a Preliminary Injunction

Although the FTC's showing creates a presumption in favor of a preliminary injunction, the Court must still weigh the equities to determine whether this relief would be in the public interest. 15 U.S.C. § 53(b). The Court must consider the interests of the public, "either in having the merger go through or in preventing the merger," and the private equities, which "include the corporate interests" of the Defendants. *F.T.C. v. Swedish Match*, 131 F. Supp. 2d 151, 172 (D.D.C. 2000). Here, effective enforcement of federal antitrust laws and the need to preserve the Commission's capacity to order meaningful relief require granting the FTC the injunction it seeks.

1. The Public Equities Support Injunctive Relief

As the FTC has shown a likelihood that the proposed transaction will substantially lessen competition, the "public interest in effective enforcement of the antitrust law" weighs in favor of granting an injunction. *Heinz*, 246 F.3d at 726. *See also Swedish Match*, 131 F. Supp. 2d at 173 ("There is a strong public interest in the effective enforcement of the antitrust laws that weighs heavily in favor of an injunction in this case.").

Also supporting an injunction is the "public interest in ensuring that the FTC has the ability to order effective relief if it succeeds at the merits trial." *Sysco*, 113 F. Supp. 3d at 86. The Defendants contend that a post-merger divesture of two Cristal plants in Ashtabula, Ohio, would sufficiently alleviate any anticompetitive concerns the Commission has. Defs.' Unredacted Opp. to Prelim. Inj. 40. They are incorrect. "Section 13(b) [of the FTC Act] itself embodies congressional recognition of the fact that divestiture is an inadequate and unsatisfactory remedy in a merger case." *Heinz*, 246 F.3d at 726. *See also F.T.C. v. Dean Foods Co.*, 384 U.S. 597, 606 n. 5 (1966) ("Administrative experience shows that the Commission's inability to unscramble merged assets frequently prevents entry of an effective order of divestiture."). The FTC explained that "divestitures are really hard to do, particularly post-consummation divestitures" and that they can take up to "seven years to sort out." Hr'g Tr. 770:10-21.

Divestitures may not succeed at restoring competition to the post-merger market. A recent FTC study, for instance, notes that "[i]t may be particularly difficult to restore the pre-merger state of competition if the merging parties have commingled, sold, or closed assets; integrated or dismissed employees . . . or shared confidential information." Fed. Trade Comm'n, *The FTC's Merger Remedies 2006-2012* 18 (2017). In fact, for consummated mergers from 2006 - 2012, only about 25% of the remedies that the Commission ordered were considered "a success." *Id.* Thus, the public interest in ensuring the FTC can order a practicable remedy to preserve market competition supports granting a preliminary injunction.

Pointing to *F.T.C. v. Weyerhaeuser Corp.*, 655 F.2d 1072 (D.C. Cir. 1981), the Defendants suggest that "[i]f strong equities favor consummation of the transaction, a hold separate order [rather than an injunction] will check interim competitive harm, and such an order

will permit adequate ultimate relief." Hr'g Tr. 826:5-8. In *Weyerhaeuser*, the district court permitted a proposed merger to proceed, but it required the defendants "to hold separate a portion of the assets" during the FTC proceedings. 655 F.2d at 1074. Tronox asks the Court to issue a similar order here.

Putting aside the fact that this 1981 case appears to be the last time the D.C. Circuit blessed such an arrangement, the proposed merger is different in several crucial respects to the *Weyerhaeuser* merger. There, the FTC challenged only part of the deal, the firm being acquired was "a privately held family corporation with about ninety shareholders," and the court found that the merger would result in an "almost certain" increase in product supply. *Id*. at 1074-75. The court also determined that a post-merger divesture of the asset in question, a corrugating medium mill, would be a "feasible remedy." *Id*. at 1075. Cristal is not a small, privately held family corporation, it is possible that the proposed transaction will create incentives to decrease—rather than increase—TiO2 supply, and the Ashtabula plants are not small assets that can be summarily divested.[13] Thus, a hold-separate order will not suffice.

2. The Private Equities do not Outweigh the Public Equities

The Defendants strenuously argue that the Commission has proceeded in bad faith. They contend that "[t]he FTC has unreasonably delayed its request for a preliminary injunction." Defs.' Unredacted Opp. to Prelim. Inj. 34-35. The Commission, they allege, used "its regulatory processes to increase the costs and burdens of moving forward with the transaction instead of seeking a fair and expeditious resolution of the legal issues." *Id*. at 38. To keep the deal alive,

[13] *See Tronox Submits Definitive Agreement to the European Commission Required for Approval of Cristal Acquisition*, *available at* https://www.tronox.com/tronox-submits-definitive-agreement-to-the-european-commission-required-for-approval-of-cristal-acquisition/ (last accessed August 28, 2018) (valuing the Ashtabula plants at between $900 million and $1.1 billion).

Tronox has "had to agree to more than $130 million in additional consideration that it would not have had to pay if the FTC had promptly sought injunctive relief months ago." *Id*. at 39.

To be sure, the posture of this case is unique as, typically, the FTC seeks injunctive relief before an administrative trial has occurred. *See* Admin. Trial Hr'g Tr. 11:25-12:4, ECF No. 70-6 (ALJ noting that "this is the first case I'm aware of, in a nonconsummated merger, where we're in this position, going to trial, where the Government has not moved for a preliminary injunction. It's never happened as far as I know."). Thus, the Defendants have borne additional costs by presenting their arguments both here and before the Commission's ALJ, and they have devoted additional time and resources to the proposed transaction. This is unfortunate.

The Court is not, however, persuaded by the Defendants' gloss on the FTC's motives. Preliminary injunctions are equitable remedies to be used sparingly and in exigent circumstances. *See Sysco*, 113 F. Supp. at 23 ("The issuance of a preliminary injunction prior to a full trial on the merits is an extraordinary and drastic remedy.") (cleaned up). Until foreign regulators approved the proposed merger, there was no imminent threat to competition, so a request for injunctive relief would have likely been unripe. *See Lewis v. Continental Bank Corp.*, 494 U.S. 472, 477 (1990) ("[F]ederal courts may adjudicate only actual, ongoing cases or controversies.").

And it is far from clear that, but for the injunction request, the Defendants would have consummated the merger without having to negotiate an extended closing deadline. The Defendants went through a lengthy regulatory review process in the European Union. European regulators conditioned their approval of the merger upon a partial divestiture of assets from a Tronox facility in the Netherlands (the "Botlek plant"). Mr. Quinn claimed that Tronox "could have any point just agreed to sell the Botlek plant and, you know, been assured of a resolution in

Europe." Hr'g Tr. 609:2-4. Selling the plant would have removed this roadblock, forcing the FTC to file an injunction sooner. Indeed, the FTC filed this action because approval from European regulators was "the only remaining hurdle preventing Defendants from consummating the Acquisition." Compl. 2.

But Tronox did not sell the Botlek plant to hasten resolution of the regulatory process, as the firm believed that "a divestiture of a whole plant . . . was completely disproportionate to any theories of harm that the EU was asserting." Hr'g Tr. 640:6-8. Thus, the Defendants had discussions with the European Commission "for a number of months," presented evidence at a formal hearing process, and negotiated approval based on a narrower divestiture. Hr'g Tr. 609:11-610:15. While the Defendants had every right to press their case with the EC, they—not the FTC—painted themselves into this corner. The EC announced its approval of the merger on July 4, 2018,[14] and the FTC filed its Motion for Preliminary Injunction less than a week later.

Finally, the harm to the Defendants from putative delays caused by the FTC is at least somewhat mitigated by the fact that any injunctive relief imposed here would be brief compared with a typical Section 13(b) action. In the ordinary case, an injunction means a merger cannot be consummated until the Commission completes its investigative and adjudicative activities. Here, the FTC has already scrutinized the deal and held an administrative trial. The ALJ will likely issue his initial decision before the end of the year, allowing the parties to obtain a decision on the merits within a matter of months. Thus, the harm to the Defendants from a preliminary injunction is lower than in the typical case, in which the administrative process would not yet have begun.

[14] *See Commission Approves Tronox's Acquisition of Cristal, Subject to Conditions, available at* http://europa.eu/rapid/press-release_IP-18-4361_en.htm (last accessed August 28, 2018).

The equities weigh in favor of granting the Commission a preliminary injunction. There are strong public interests in ensuring the effective enforcement of antitrust laws and in equipping the FTC with the ability to order appropriate remedies. These interests cannot be overcome by the private equities proffered by the Defendants.

IV. CONCLUSION

The Commission has successfully shown that, in evaluating the proposed merger between Tronox and Cristal, the relevant antitrust market comprises sales of chloride-process titanium dioxide in the United States and Canada. It has raised serious, substantial, and difficult questions about the merger's possible anticompetitive effects. It has presented credible evidence that the merger will create a highly concentrated market in which producers face greater incentives to engage in strategic output withholding. Because of these showings, and because the equities favor injunctive relief, the Court will grant the FTC's Motion for Preliminary Injunction. A separate order will issue.

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Dated: September 12, 2018

TREVOR N. MCFADDEN, U.S.D.J.