

## UNITED STATES OF AMERICA BEFORE THE FEDERAL TRADE COMMISSION OFFICE OF ADMINISTRATIVE LAW JUDGES

08 14 2018 591858

In the Matter of

Tronox Limited a corporation,

National Industrialization Company (TASNEE) a corporation,

National Titanium Dioxide Company Limited (Cristal) a corporation,

And

Cristal USA Inc. a corporation.



**PUBLIC** 

Docket No. 9377

## COMPLAINT COUNSEL'S POST-TRIAL PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW

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Dated: August 14, 2018

(c)	The merger would increase transpareamong North American chloride TiC producers	
(d)	The merger would result in greate many etry between the merged firm and	

i.	Dr. Zmijewski Is the Only Expert to Provide a Methodology for Evaluating the Claimed Efficiencies and the Only Expert to <b>Op</b> About the Claimed Efficiencies in a Guidelines Framework
	(a) Tronox's experts do not conductaidelines analysis of the claimed efficiencie 245
ii.	Tronox's Claimed Efficiency of Increasedoduction at Cristal's Pigment Plant in Yanbu, Saudi Arabia, Is Not Cognizable247.
	(a) The Yanbu improvement synergy is not verifiable249
	(b) The Yanbu improvement synergy is not merger-specific253
iii.	Tronox's Claimed Efficiency of Activatinthe Jazan Slagger in Saudi Arabia Is Not  Cognizable
	(a) The activating Jazan synergy isesplative and not verifiable263
	(1) The option agreement highlights the splative nature of the activating Jazan synergy
	(2) Other factors make the activating Jazan synergy speculative264
	(b) The activating Jazan synergy is not merger-specific266
iv	. Tronox's Other Claimed Outputfleciencies Are Not Cognizable274
	(a) Respondents' claimed synergy of applying best practices across TiO2 pigment plants is not cognizable
	(b) Respondents have not provided sufficient information to evaluate their claimed synergy of activating capacity, idled because of Tronox's current "net long" position 276
	(c) Respondents' claimed synergy of swappilmenite between mines at reactivated slag furnaces is not cognizable
V.	Tronox's Claimed Cost Savings Effiencies Are Not Cognizable279
	(a) Respondents' claimed "value ineussynergy is not cognizable279
	(b) Respondents' claimed "optimize pigme <b>agi</b> stics cost" synergy is not cognizable 281
	(c) Respondents' claimed "supply chain, indhod PET coke savings" synergy is not cognizable
	(d) Respondents' claimed "Western Austradiatorine optimization" synergy is not cognizable
aimed."value in usco	f Tronox's c6/TO16 TcJ4Pa20192094/9MC/IDv5f77/1619161./17507161 (sclalogy fuirhancess is not co

٧	Tronox's Claimed Efficiencies of Vecal Integration Ae Not Cognizable291	
	(a) Since becoming vertically integrate with the Exxaro merger, Tronox has on multiple occasions reduced production both feedstock and TiO2 pigment 29	1
	(b) Through increased production of TiO2 pignt, Tronox has ability to enhance its vertical integration absert proposed acquisition	295
B.	Tronox Has Not Demonstrated that the Cladin Ediciencies at Facilities Located Outside	
	North America Would Positively Imaget North American Customers	

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I. JURISDICTION

1. Tronox Limited ("Tronox") and Cristal USA Incengage in activities in or affecting "commerce" as defined in Section 4 of the FAct, 15 U.S.C. § 44, and Section 1 of the Clayton Act, 15 U.S.C. § 12. (JX0001 at 001 (Jastipulations of Jurisdiction, Law, and Fact)).

## II. BACKGROUND

A. <u>Proposed Transaction</u>

2.

\_\_\_\_

- 7. Tronox owns and operates titanium feedstooking assets and a titanium feedstock plant producing synthetic rutile in Chanda Australia. (PX9040 at 10 (Tronox investor presentation)).
- 8. Three legal entities collectively represent "Stal." Cristal USA Inc. is a Delaware corporation and an indirectlywned subsidiary of Saudi Arabian companies The National Industrialization Company ("Tasnee") and e National Titanium Dioxide Company.

  (JX0001 at 001 Joint Stipulations of Jurisdiction, Law, and Fact)
- 9. Cristal owns and operates five chlorid Piplants, two of which are located in Ashtabula, Ohio, one in Yanbu, Saudia ia, one in Stallingborough, United Kingdom, and one in Bunbury, Australia. (PX90400at0 (Tronox investor presentation); PX7008 (Hewson, Dep. at 11)r(camera).
- 10. Cristal owns and operates the sulfate TiO2 plants, located in Thann, France, Bahia, Brazil, and its Tikon plant located thina. (PX9040 at 010 (Tronox investor presentation); PX7008 (Hewson, Dep. at 11-11/2):(amera)).
- 11. Cristal owns and operates titanium feedstock mining assets in Australia, formerly known as Bemax. (PX9040 at 010 (Tronox investor presentation); PX7006 (Stoll, IHT at 42) (camera).
- 12. Cristal owns and operates tatiium feedstock mining asset in Paraiba, Brazil. (PX9040 at 010 (Tronox investor prestation); PX0002 at 024 (Cristis Narrative Response to the Second Requestin (camera).

13. Cristal owns a titanium feeds**tos**melter in Jazan, Saudi Arak

[PX7018]

(Trabzuni, Dep. at 179-80in(camera).

## C. <u>Titanium Dioxide (TiO2)</u>

- 14. TiO2 is an essential pigment used to add whiteness, brightness, opacity and durability to paints, industrial and automotive coating stics, and other specialty production (lng, Tr. 642; Pschaidt, Tr. 965; X3011 at 012 (Kronos Investor Presentation); PX9020 at 006, 013, 045, 083, 117 (Chemical Economics Handbook); PX1001 at 005 (Tronox investor presentation)).
- 15. The primary customers of TiO2 include intrand coatings manufacturers and plastic producers, which account for approximate0% and 25% of the TiO2 consumed in North America, respectively. (PX9020 at 042 (Chemical Economics Handbook); PX3011 at 012 (Kronos Investor Presentation)). Prapred other specialty products, such as ink, food, cosmetics, and pharmaceuticals, the eremainder. (PX9020 at 042 (Chemical Economics Handbook); PX3011 at 012 (Kroinoxestor presentation)).
- 16. For nearly all customers, there are nonomercially reasonable substitutes for TiO2. (PX9104 at 042 (Tronox 10-K)P,X1000 at 006 (Tronox Presentation) (camera); PX1073 at 117 (Bain Presentation the Tronox Board)r(camera); PX7002 (Mouland, IHT at 38-40) (n camera); PX8002 at 001 (¶3) (Christian Decih) (camera); PX8006 at 001 (¶5) (Pschaidt Decl.in(camera); PX8003 at 002 (¶¶ 6-7) (Young Decih) (camera); Vanderpool, Tr. 173-74; Malichky, Tr. 273-)74
- 17. TiO2 is produced from titanium-containing ores through one of two manufacturing processes that extract TiO2 from (1) the chloride processhat uses chlorine; and (2)

28.

35.	PPG, a coatings manufactur
	(Malichky, Tr. 274, 295-96 (partially in camera) X8000 at 004 (¶19) (Malichky Decl.)
	({
	at 003 (¶15) (Malichky Decl.)(
	}) (partially in camera)).
36.	For Sherwin-Williams, the largest paint producer in North Amet
	} in its products sold in North America
	(Young, Tr. 670 i(n camera)).
37.	In North America, Sherwin-William
	} (PX8003 at 003 (¶¶ 12-13) (Young De¢partially in camera). Sulfate
	TiO2 {
	}" (PX8003 at 003 (¶12) (Young Decl.) (partiality
	camera).
38.	Specifically,{
	} (PX7020 (Young, Dep. at 125-26)) (camera)).
39.	

TiO2 producers also agree that sulfate TiO2 and chloride TiO2 are not interchangeable in

40.

1	} (PX7052 (O'Sullivan, Dep. at 145-47) (in cam)era
North American custor	ners ha{ } than many other
egions. (PX8004 at 0	02何 (O'Sullivan Decl.) {
}) (in camera)	).
(1)	North American customers demand chloride TiO2 over sulfate TiO2 for most their products
iO2 producers and cu	stomers all recognized slignificantly more chloride TiO2 is
urchased in North Am	nerica as compared to sulfate T(PX9012 at 008 (Q4 2014
ronox earnings call) (	Tronox recognizes thatoride TiO2 dominates the North
merican market, mak	ing up "95% or 98% or some very, very high numb@K1)322
t 003 (Tronox present	rationin (camera); PX7000 (Snider, Dep. at 82-8
	}) (in camera)).
he disproportionate a	mount of chloride purchased in North America is due to
customer demand. (P	X8002 at 0(¶417) (Christian Decl.)in( camera) ({
	}); PX7003
data from customers a	nd produc <b>⊕s</b> , Hill's analysis indicates th <b></b>
) (PX5000 at 04	7 (¶101Hill Initial Report) (in camera)).
End use customers in	the United States and Canada d€
	} (Malichky, Tr. 294-95i\(\hat{n}\) camer\(\pa\); PX8005

at 002 (¶ 8) (Maiter Decl.)). This cause (seed) to customers to purchase chloride TiO2 to ensure that they have the high quality products the necessary taibutes that their customers want. (Vanderpool, Tr. 183, 185 ("I tealhyou that [in all our lines] chloride [TiO2] is what we use primarily, 90, 95 (Parcent."); PX7044 (Vaderpool, Dep. at 87-91, 99-100) (in camera); Young, Tr. 643, 657 (Sherwin-Williams "use[s] predominantly chloride TiO2 in North America" – accounting f(seed)) (partially in camera); Pschaidt, Tr. 985 (Pschaidt, Tr. 985 (Christian, Dep. at 120) (in camera).

Some North American customers purcha

1065; PX7040 (Santoro, Dep. at 8th) (camera) (

3); PX7049 (Zamec, Dep. at 49

3) (in camera); PX8001 at 002 (¶ 13) (Zamec Decln) (camera). The commodities manager at Deceuninck North American vinyl manufacturer, testified that for at least the past 32 years, his teratirene company, it has never purchased sulfate TiO2 because of its need for chloride TiO2 superior "purity and quality." (Arrowood,

48.

Tr. 1065-66).

49. Customers in North America would not substitulfate TiO2 in place of chloride TiO2 in the majority of their products. (Arrowood, Tr. 1093-94; PX8006 at 001-02, 004 (¶¶ 5, 8, 20) (Pschaidt Decl()n camera); PX7044 (Vanderpool, Dep. at 87-91, 99-100) camera).

- 50. For instance, "the only way that Deceurkin[North America] would even consider sulfate TiO2 would be if chloride TiO2 as unavailable." (Arrowood, Tr. 1093). In other words, certain customers like Deceuninch America would consider sulfate TiO2 only as a last resort, to a be shutting down their factories, when chloride TiO2 becomes totally unavailable to them. (Arrowood), 1093-94; PX7049 (Zamec, Dep. at 49-50) ({
  - }) (in camera); PX7000 (L.iilablMor50004 Tw 16.13 (})21 -0.00dTw 16.13 w02 Tcl

53.	For Masco,{
	} (PX8006 at 001-02, 004 (¶¶ 5, 8, 20) (Pschaidt D@oldamera).
	{
	} (Pschaidt, Tr. 978in( camera).
54.	{"
	}
	(PX8006 at 002 (¶8) (Pschaidt Declr) ¢amerà; PX7027 (Pschaidt, Dep. at 112-13)
	(partially in camera); Pschaidt, Tr. 983-84r( camera).
55.	{
	} (Vanderpool, Tr. 192-93, 203-0ith (camera);
	Malichky, Tr. 298-99, 302-03r( camera); Young, Tr. 658-59).
56.	True Value car
	} (Vanderpool, Tr. 192,
	203-04 (n camera)).{
	} (Vanderpool, Tr. 192-93r( camerà).
57.	PPG can
	} (Malichky, Tr. 298-99, 302in camera; PX8000 at 003-04
	(¶16) (Malichky Decl.) i(n camera). {
	} (Malichky, Tr. 302-03 in camera). {

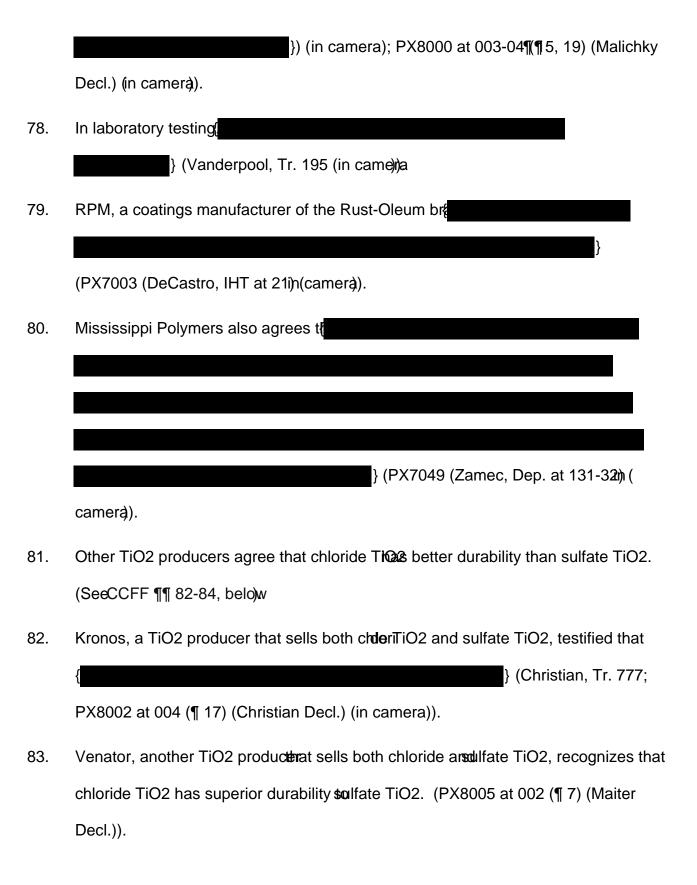
} (Malichky, Tr. 298 i(n camera)).

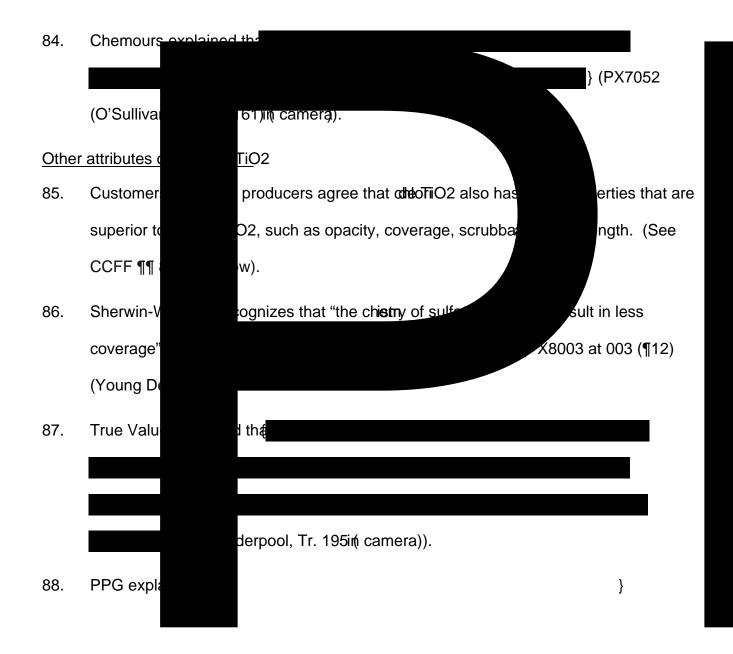
(2)

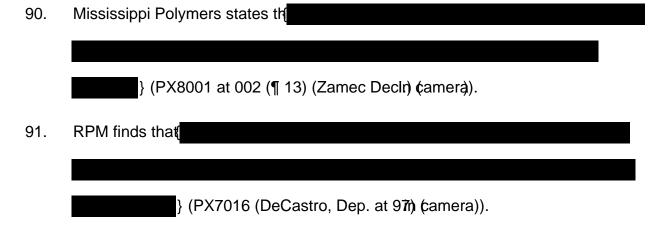
	<pre>}) (in camera);</pre>
	PX1346 at 013 (Tronox presentation) camera; PX1427 at 003 (Jean-Jacques email to
	Casey)(in camera); Van Niekerk, Tr. 3996).
60.	{
	} (Christian, Tr. 960; PX8004 at 002-03 (¶ 9) (O'Sullivan De(in).)
	camera).
61.	Specifically, Kronos notes th€
	} (PX8002 at 004 (¶¶ 17-
	18) (Christian Decl.≬in camera). Kronos also notes tha
	} (PX3038 at 022{
	(in camera)).
62.	Customers view chloride TiO2 as being higher quality than sulfate TiO2, and necessary
	for many of their applictions. (Arrowood, Tr. 1065; PX7016 (DeCastro, Dep. at 96-97)
	({
	}) (in camera; PX7044 (Vanderpool,
	Dep. at 87-91(in camera)).
63.	For example{
	} (PX8003 at 003 (¶12) (Young Dec(p)artially in camera)).

665 (in camera);Pschaidt, Tr. 978in( camera);

	achieve that [Masco] need[s] to use Tip2duced based on the chloride process."
	(Pschaidt, Tr. 973; Pschaidt, Tr. 97
	}) (in camera); PX8006 at 002, 004 (¶¶ 8,
	20) (Pschaidt, Decl.)n(camera).
73.	Tronox's own ordinary course documentstinda as far back as 2012, recognize that
	{ (PX1322 at 002 (Tronox presentation)
	({
	}) (in camera); PX1346 at 013 (Tronox Investor Presentation) ("Chloride
	technology yields consistentlyhiter, brighter pigment grad







- 92. Kronos recognizes that chloride TiO2 has sixpedint strength tosulfate TiO2 among other properties. (Chrotian, Tr. 777 ("Like I mentioned elær, it's a superior product on its optical, you know properties, whether its color undertone, or its tinting strength, durability, a whole host of different ways envaluating a grade of TiO2, and chloride products tend to outperform sulfate products.")).
  - (b) North American customers cannot regardwitch their formulation of products from chloride TiO2 to trace TiO2 due to high costs and testing time
- 93. North American customers cannot readily swiftrem chloride to sulfate TiO2 because of the significant costs, testing temand risks to their productsSe(eCCFF ¶¶ 94-110, below

	Decl.) (in camera).
99.	Reformulation from chloride TiO2 to sulfate TiO2 a{
	} (Malichky, Tr.
	301-02 (n camera); PX8002 at 004-05 (¶20) (Christian, Dec
	}) (in
	camera).
100.	Reformulation can tak (Young, Tr. 660-61It took
	Sherwin-Williams{
	}) (in camera); PX8003 at 004 (¶¶ 17-20) (Yung Decl.) (partiallyn
	camerà; Vanderpool, Tr. 186; PX8001 002 (¶ 10) (Zamec Decl.) (in camè;r₽X8006
	at 002 (¶11) (Pschaidt Declin (camera)).
101.	Reformulation can also tak
	estimates that
	qualify a new TiO2 grade. (P7X035 (Christian, Dep. at 215-16)) (camera).
102.	For coatings manufacturers, qualifying awngerade of TiO2 is a multi-step process
	including tests on outdoor weathering and subjective feedback from customers, and can
	take as long af Young, Tr. 652-54Pschaidt, Tr. 989-90

(PX7044 (Vanderpool, Dep. at 128) (camera); PX8002 at 004-05 (¶ 20) (Christian

112.	Between 2012 and 2017, chloride TiO2 had a higher price than sulfate TiO2 in North
	America. (Young, Tr. 647-48). During this timte price in North America for chloride
	TiO2 has been as much as 40% highen for sulfate TiO2. (Young, Tr. 647-48).
113.	Cristal's own executives and documents admit {
	} (PX7043 (Gigou, Dep. at 23(
	}) (in camera); PX2366 at 003 (Cristal spreadsheet for Q4
	2017) (
	}) (in camera); PX2369 at 004 (Cristal spreadsheet for Q1 2€
	}) (in
	camera).
114.	Tronox's sales executive admits that trales teams are instructed
	} (PX1431 at 001 (Duvekot
	email) ((
	}) (in camerà; Duvekot, Tr. 1295-
	98 (in camera); PX7026 (Duvekot, Dep. at 64-65) (
	}) (in camera).
	) (in camera).
115.	{
	} (PX7026 (Duvekot, Dep. at 64-65

	}) (in camerà).
121.	Cristal's sales executive for North America admits (
	} (PX7037 (Pickett, Dep. at 123-24n) (camera).
122.	Kronos, a TiO2 competitor, also observed (
	} (Christian, Tr. 819-20, 22 (Krong
	} during the shortages) (in came;ra
	PX7035 (Christian, Dep. at 138, 160-6ih) ¢amerà). Kronos does no
	}
	(PX3038 at 022{ }) (in camera)).
123.	Customers have not switched to sulfate TiO2newith chloride TiO2 being consistently
	higher priced than sulfate TiO2SeeCCFF ¶¶ 124-31, below).
124.	As True Value's Mr. Vanderpool testifie

	} (Vanderpool, Tr. 197in camera).
125.	In fact, Mr. Vanderpool of True/alue is unaware of any inastice, regardless of price, in
	which True Value switched from using a grade of chloride TiO2 to a grade of sulfate
	TiO2. (Vanderpool, Tr. 187).
126.	Sherwin-Williams(
	} (Young, Tr.
	668-70 (n camera); PX8003 (Young Decl. ¶¶ 12-13) (partiællycamera).
127.	Even when sulfate TiO2 wa
	{
	} (Young, Tr. 669-70
	(in camera); PX7020 (Young, Dep. at 13ih) ¢amera; PX8003 at 003 (¶¶ 12-13)
	(Young Decl.) (partiallyin camera)).
128.	Sherwin-Williams continually purchased highericed chloride TiO2 "[i]n order to
	consistently meet our customers' requieents for quality and performance." (Young, Tr.
	648). {
	} (Young, Tr. 669-70i() camera).
129.	PPG{
	} (PX7025 (Malichky
	Dep. at 117-19)in camera).

of chloride TiO2 from Tronoxor has it considered switch to purchasing any sulfate TiO2. (Arrowood, Tr. 1093 ("Just -- on the sulfate TiO2, just to be, you know, very candid, the only way that Deceuninck would be woonsider sulfate TiO2 would be if chloride TiO2 was unavailable.")).

- ii. Sales to Customers in the United States Canada ("North America") Is a Relevant Geographic Market
- 134. The Horizontal Merger Guidelines provideramework for defining the relevant geographic market. (PX9085 at 016 (Horizal Merger Guidelines, § 4.2) For purposes of calculating market shares and analyzing competitive effects for chloride TiO2, the appropriate way to analyze the vent geographic market is based on the location of customers (PX9085 at 017H orizontal Merger Gidelines, § 4.2.2)).
- 135. Defining the geographic market by custorhoeation is appropriate cause (1) TiO2 producers are able to price discriminate by one; and (2) the ability to arbitrage is limited. (PX9085 at 017Horizontal Merger Guidelines, § 4.2.2)).

136.

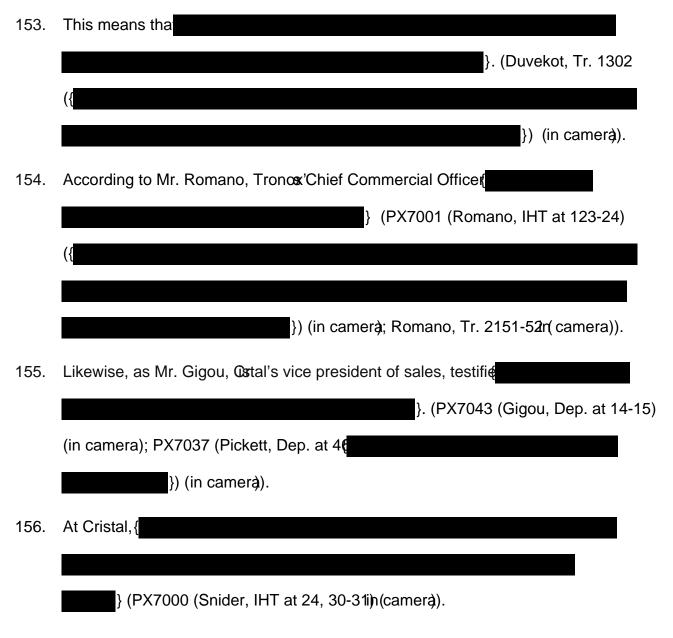
138. Chloride TiO2 is delivered to customer locations, an

## } (SeeCCFF ¶¶ 165-71, below).

- analysis consistent with the Horizontal Mer Guidelines, Dr. Hill concluded that the geographic market based on locations of commers is the right framework because chloride TiO2 producers are engaging in geographic price discrimination. (Hill, Tr. 1714). Dr. Hill's conclusion is based on that for customers, thus can price discriminate, and that for customers, arbitrage is not a commercially feasible means of avorigia price increase. (Hill, Tr. 1714-15).
- 141. Dr. Hill concluded, after reviewing documentestimony, and performing an economic analysis, that North America is a relevageographic market in which to assess the effects of the proposed acquisition. (Hill, Tr. 1756e CCFF ¶¶ 160-64, below). This geographic market includes all sales of cidle TiO2 in North America, regardless of country of origin or supplieand, by definition, includes the of North America TiO2 sales that consist of chlorideO12 imported from abroad. (Hill, Tr. 1725-26; PX7056 (Hill, Dep. at 240)in camera; PX5000 at 032 (¶ 78) (Hill Initial Reportin)

- camera). Moreover, rutile TiO2 imports comprise ab ( ) of the North American rutile TiO2 consumption. P(X5000 at 032 (¶ 78 n.130) i(Hnitial Report) (in camera)).
- 142. Based on an economic analysis consistent the Horizontal Merger Guidelines, including the Hypothetical Monopolist Test and anadysis the qualitative information in the record from suppliers and customens, Hill concluded that a SSNIP by a hypothetical monopolist controlling all salesomens TiO2 to North American

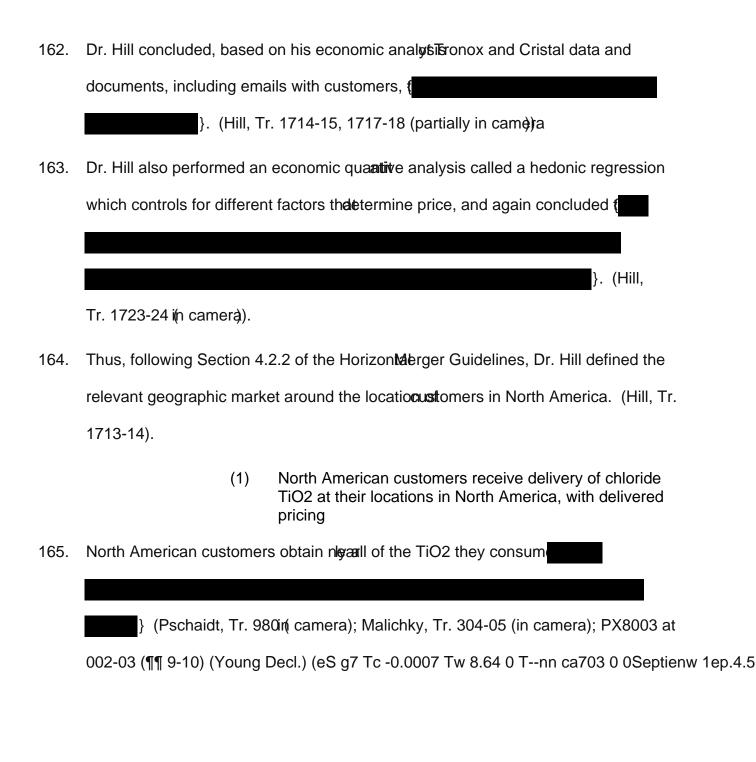
	that demand in the U.S. and Canada is simalified that Mexico is a different region. It
	has different demand."); PX5000 at 024-25 ( $\P\P$ 56-58) (hitial Report) (n camera)).
146.	For example, seasonality of demand for architeal paints, for which TiO2 is a main
	ingredient, varies by geographic regi (PX7025 (Malichky, Dep. at 257-58
	)) (in camera)). In fact, seasonal demand for TiO2 varies by
	geographic regio(
	}. (PX7050 (Mei, Dep. at
	137-38) (n camera).
147.	Moreover, TiO2 producer
	. (PX1327 at 005, 025 (Tronox LATAM 2015-
	2017 Strategy) {
	}) (in camera); PX7000 (Snider, IHT
	at 24) <b>(</b>
	(in camera);PX8004 at 002 (¶ 7) (O'Sullivan Declin (camera); PX8005 at 002 (¶ 8)
	(Maiter Decl.)).
	(a) Suppliers price-discriminate basen customer location by region
148.	North American chloride TiO2 producer-Tronox, Cristal, Chemours, Kronos, and
	Venator—{
	}. (PX8002 at 003 (¶ 13) (Christian Declr) ¢amerà;
	PX8004 at 002 (¶ 7) (O'Sullivan Declijn(camera).

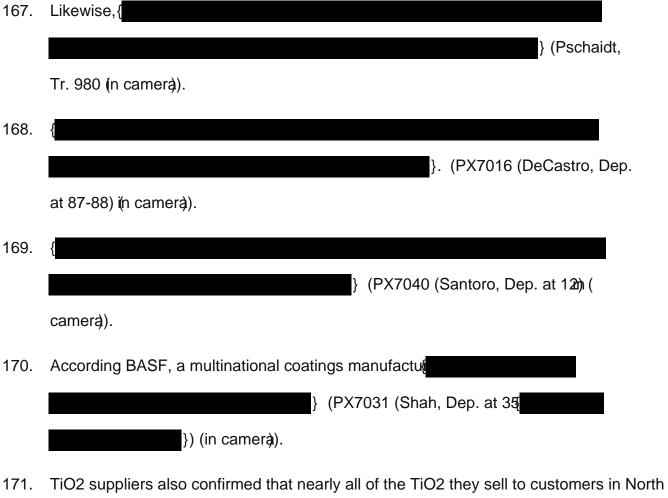


157. According to Mr. Stoll, who was Cristal'vice president of commercial during 2010-13, different TiO2 market dynamics in different different gions were "driven by supply and demand dynamics in those particular regions." to Tr. 2094). The competitive dynamics in Latin America at a particular time might different from the competitive dynamics in North America, "[b]ased on supply and demandGDP in particular countries in those regions." (Stoll, Tr. 2094-95). Therefore etharket dynamics are "quite different" in emerging markets than "in mature markets like North America, Tr. 2095).

158. Sim	nilarly, as Mr. Stoll testified in a deposition taken during one of the price fixing
litig	gations, when determinin{
	}

(PX2245 at 058In Re: Titanium Dioxid Antitrust Litigation Deposition Transphring) 1 Tf 0.0003 T7

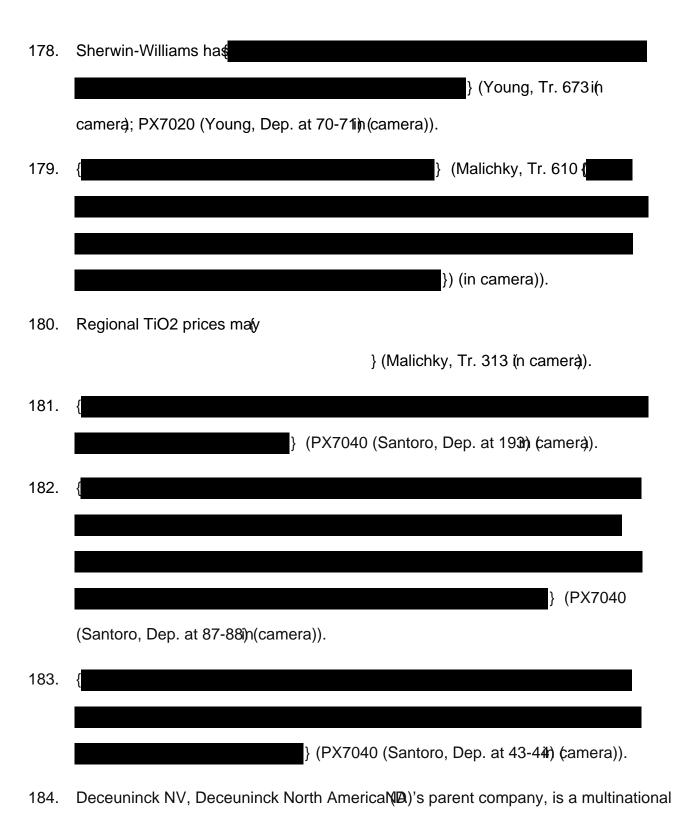




- 171. TiO2 suppliers also confirmed that nearly all of the TiO2 they sell to customers in North America is delivered to the customers' location sold on a delived pricing basis.

  (PX7015 (Maiter, Dep. at 176)).
  - (2) Customers negotiate and purchase chloride TiO2 separately for each geographic region and pay different prices in each region

173.	{
	} (PX8003 at 006 (¶\$7-28) (Young Decl.)in camera; seeCCFF ¶¶ 192, 198, below).
174.	As customers testified
	} (Young, Tr. 672ih camera); PX8003 at 006 (¶ 28) (Young Decl.)ih camera).
175.	For example{
	} (Malichky, Tr. 311-12i( camera)).
176.	Similarly, {
	} (PX7033 (Post, Dep. at 153-54)) (camera).
177.	The TiO2 pricing in one regin
	(PX1456 at 001 Duvekot email to Tan and Mouland
	}) (in camera); PX1451 at 001 (Duvekot email to Bradlety)c(amera).



vary by region due to weather differences; tomer demand differences, and differences in the number of TiO2 suppliers. (PX7030 (Amropod, Dep. at 64-65)). For example, as compared to its European operations, in North America, DNA uses larger quantities of TiO2 in its vinyl products, very pure great, and a different UV stabilizer. (PX7030 (Arrowood, Dep. at 65-66)).

185. For PPG, the markets for its products that use TiO2 differ by region. (PX7025

189. PPG has teams in different regions, with

193. {

PX7025 (Malichky, Dep. at 77, 81i)n(camera);

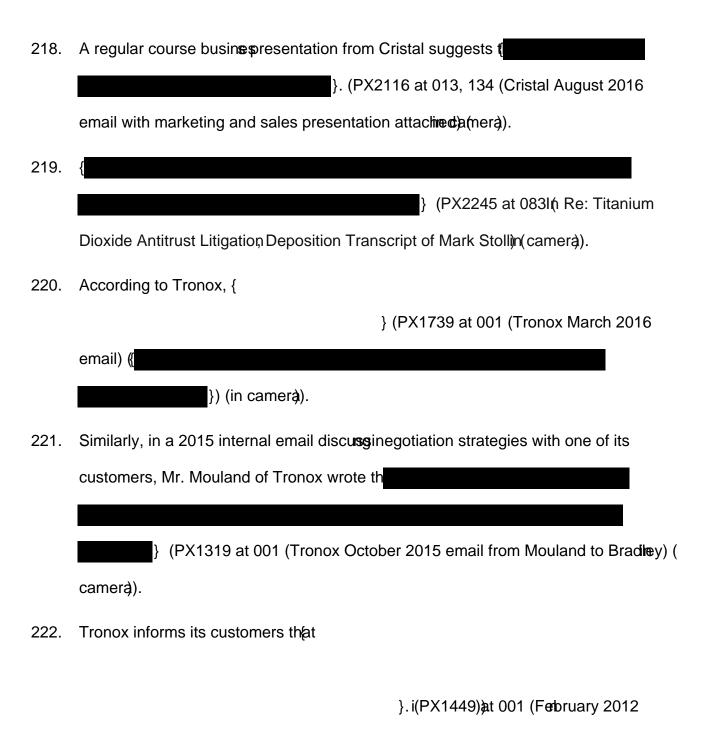
PX7043 (Gigou, Dep. at 83i)n(camera); Young, Tr. 670-71n(camera); Christian, Tr. 786-87;see CCFF ¶¶ 194-98, below).

- 194. For example, Deceuninck North America (DNA) plastics manufacturer, has sourced all the TiO2 that it purchased in the UndtStates from Tronox's Hamilton, Mississippi plant. (PX7030 (Arrowood, Dep. at 109)). The Ti is shipped by truck in supersacks to DNA's Ohio plant. (PX7030 (Arrowood, Dep. at 105)).
- 195. According to Mr. Arrowood of DNA, the ipportant factors to consider when buying

198.	As Mr. Young of Sherwin-Williams testified		
	} (Young, Tr. 670-		
	71 (in camera)).		
	(3) Tronox and Cristal's ordinary course documents and their executives' testimony confirm the regional nature of chloride TiO2 pricing and purchasing		
199.	Testimony and ordinary course documenterfrTronox and Cristal confirm the market		
	reality of regional pricing and pomasing of chloride TiO2. See CCFF ¶¶ 200-25,		
	below).		
200.	As Tronox's Mr. Mouland admitted		
	} (Mouland, Tr. 1173in camera)).		
201.	In March 2017{		
	} Mr. Mouland responded by writing		
	{		
	) (PX1682 at 001 (Mouland email to Larsoin) (		
	camera).		
202.	In July 2016, Tronox's Mr. Mouland informé		

	{
	}) (in camera).
210.	As Mr. Snider, Cristal's mathing director acknowledge
	} (PX7000 (Snider, IHT at 34-3fin(camera)).
211.	The majority of TiO2 sold out of Tronox's Ichride TiO2 manufacturing facilities is sold
	into the same region where each plantocated. (Quinn, Tr. 2418)Specifically, a
	significant majority of the sales cominogit of Tronox's Hamilton, Mississippi plant
	serves the North Amerian region. (Quinn, Tr. 2418).
212.	Reflecting the market realit
	(PX1006 at 010
	(Tronox Nov. 2016 TiO2 Review)r(camera); PX1021 at 002 (Romano email to
	Turgeon) {
	}) (in camera); PX2025 at 008 (Cristal presentation)camera; PX2041 at
	010 (Snider email with attachment
	<pre>}) (in camera);</pre>
	PX7037 (Pickett, Dep. at 46)n(camera); PX7043 (Gigou, Dep. at 14-15)
	}) (in camera); PX2366 at 003 and PX2367 at
	004 (Cristal spreadsheet
	}) (in camera).

213.	The regional nature of pricing for chloride TiO2
	} (See CCFF ¶¶ 214-23, below).
214.	For example{
	(Mouland, Tr. 1172i() camera).
215.	Similarly, Mr. Romano explained dung an investigational hearing
	} (PX7001 (Romano, IHT at 145-46)) (
	camera); see alscRomano, Tr. 2152(
216.	}) (in camera)).  Thus, Tronox's oft-repeated view on this issueaptured in an email from Mr. Mouland:
	{
	} (PX1456 at 001 (Mouland email to Tan) (in cam)era
217.	In 2014, Mr. Mouland of Tronox observed tk
	} and noted that he had reiterat
	PX1301 at 001-02 (Mouland email to Duvekot and Romano) (
	camera).



224.	{
	} (PX7043
	(Gigou, Dep. at 83)in camera)).
225.	In the price-fixing litigation, Cristal's forer global accounts manager testified that
	{ (PX2252
	at 040 (n Re: Titanium Dioxide Antitrust Litigation Deposition Transcript of Jerry
	Bassett) (
	}) (in camera).
	(4) Testimony from other chloride TiO2 producers also confirms the regional nature of chloride TiO2 pricing and purchasing
226.	Other TiO2 producers also employ regional pricing based on regional competitive
	conditions. See CCFF ¶¶ 227-31, below).
227.	For example{
	}. (PX8002 at 004 (¶ 15) (Christian Decl.) (in can)e(ra
	}"); Christian, Tr. 931
	}) (in camera).
228.	For Kronos,{
	}. (PX3038 at 34{
	}) (in camera)).

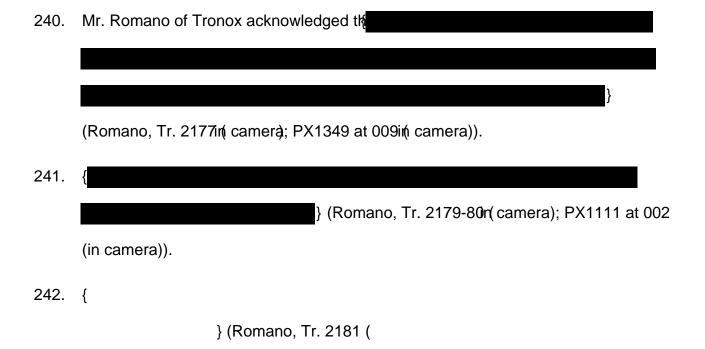
229.	Venator assesses i	its TiO2	2 business on <b>botto</b> bal and regional basis. (PX8005 at 004
	(¶ 23) (Maiter Decl.	) ("At a	ny given time, the competitive dynamics in each region may
	vary, so we also ar	nalyze (	demand and supply conditions, pricing, and financial
	performance by reg	gion on	a monthly and quarterly basi
			}. (PX7015
	(Maiter, Dep. at 13	5)ir(i car	mera).
230.	Mr. O'Sullivan of C	hemou	urs stated tk
			} (PX8004 at 002 (¶ 7)
	(O'Sullivan Decl.) (	n came	era). Chemours further explains th
			}. (PX8004 at 002 (¶ 7) (O'Sullivan
	Decl.) (n camera).		
231.	Like other TiO2 pro	ducers	s, Chemounsganizes its chloride TiO2 busines
			) (PX8004 at 002 (¶ 7) (O'Sullivan
	Decl.) (in camera).		
		(5)	Between 2012 and 2016, North America sustained higher prices for chloride TiO2 compared to the rest of the world

232. Although regional prices vary relative one another, at letalsetween 2012 and 2016,

TiO2 prices in North America remained sitigationally higher than those elsewhere in the world. (See

233.	North American TiO2 prices are traditionalligher than other regions because of supp				
	and demand conditions. (PX80030a)6 (¶ 27) (Young Decl.)).				
234.	{				
	} (Young, Tr. 673-74in camera)).				
235.	Similarly, in an email to a Tronox TiO2 sales mana				
	}. (RX0504 at 0001 (Doherty email)				
	(in camera)).				
236.	Dr. Hill determined in his analysis, basedi <b>pv</b> oice data from Tronox and Cristal, that				
	North American TiO2 customers consistently p				
	} for products made at				
	Respondents' North American factories. (Hill, Tr. 1722-24 (partiallyamera); PX5000				
	at 063-64 (¶ 144 & Fig. 24) (Hill Initial Reportin(camera); Shehadeh, Tr. 363				
	}) (in camera).				
237.	Based on his economic analysis of Tronox anidt@rdata, Dr. Hill concluded that there				
	are{				
	}. (Hill, Tr.				
	1723 (n camera); PX5004 at 035-36 (¶ 83 & Fig.13) i(HRebuttal Report to Shehadeh)				
	(in camera)).				

- 238. In addition to the descriptive analysis, Dr. Hill also performed a quantitative economic analysis—a "hedonic regressi<del>" on</del> with customer-grade level data and concluded that even for a particular customer for a particular grade, the price in North America has been higher than the price in other regions. (Hill, Tr. 1723-24; PX5000473 (¶¶ 173-74, 176) (Hill Rebuttal Reproto Shehadeh) in (camera).
- 239. Other evidence also shows that North Ameripærducers charged highprices in North America compared to other region sthe world between 2012 and 201 (See CCFF ¶¶ 240-58, below).



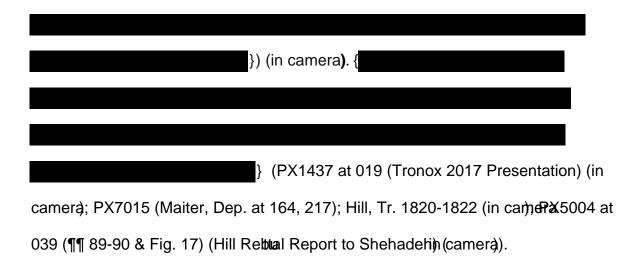
244.	In a May 2016 emat
	}, Mr. Romano wrote to Ms. Stato@FO for Tronox's TiO2 business,
	{
	} (RX0250 at 0001 (Romano email to Staton and Turgenon) (
	camera). According to the data in the same email cha
	}. (RX0250 at 0002 (Tronox emailin(
	camera).
245.	{
	} (PX7052
	(O'Sullivan, Dep. at 145-47)r( camera);see alsoPX8004 at 002 (¶ 7) (O'Sullivan
	Decl.) (in camera). {
	} (PX7052 (O'Sullivan, Dep.
	at 145-47) i(n camerà).
246.	As Mr. Maiter of Venator testified
	} (PX7015 (Maiter, Dep. at 180-81in)
	camera).
247.	Between 2011 and 2016, the price PPG was charged for chloride TiO2 in the United
	States was higher, on average, than $time p$ parts of the world. (PX8000 at 002 (¶ 7)
	(Malichky Decl.)).

<b>∠40.</b>	), IVII. IVIOUIANIA TEPOTIECI IO IVII.
	Romano:{
	} (PX1105 at 003
	(Tronox email with attachmentin(camera).
249.	In March 2013, "[m]arkets in North Americaæstill under pressure to decline since they
	are so much higher than the other regiontshefworld, however, [Cristal] [is] trying to
	hold on to the current price levels PX2030 at 003 (Stoll eail to Nahas)).
250.	A Tronox presentation emailed in December 2013 notes
	} (PX1349 at 009 (Tronox presentation)
	({
	}) (in camera).
251.	In a January 2015 email, Tronox's Mr. Duvekot noted (
	} (PX1317 at 001 (Duvekot email to Romanion) (
	camera).
252.	In a 2015 earnings call, Tronoxported that TiO2 prices in orth America were higher
	than the TiO2 prices in the Europeanjaksand Latin American markets. (PX9008 at

008 (Tronox Q4 2015 Earnings Call) (TronoxenthCEO stating "[A]re there different

	yes.")).
253.	A Tronox June 2016 presentation shows {
	} (PX1008 at 011 (Tronox TiO2 Variance Analysiss) ¢amera).
254.	A March 2015 Cristal report acknowledges t
	} (PX2050 at 005 (Cristal email with
	report attached)in( camera).
255.	A September 2016 Cristal email refers
	(PX2027 at 001 (Cristal emailin(camera).
256.	Another September 2016 Cristal en
	} (PX2039 at 001 (Cristal emailin(camera).
257.	In a 2016 earnings call, Tronoxpoerts that TiO2 prices in urope and Asia were lower
	than prices in North America. (PX90010407 (Tronox Q3 2016 Eaings Call) ("[O]ur
	view is that prices in Europænd in Asia were lower thaprices in the United States and
	in other North American the other North American markets.")).
258.	After more than five years offigher North American price
	PX5004 at 039 (¶ 90 & Fig. 17) (HRebuttal Report to Shehadeh) (European
	prices spiked because of a fire at a TiO2apht in Pori, Finland in early 2017,
	which caused a severe shortagie.)c(amera); see alsoPX1437 at 019 (Tronox
	presentation){

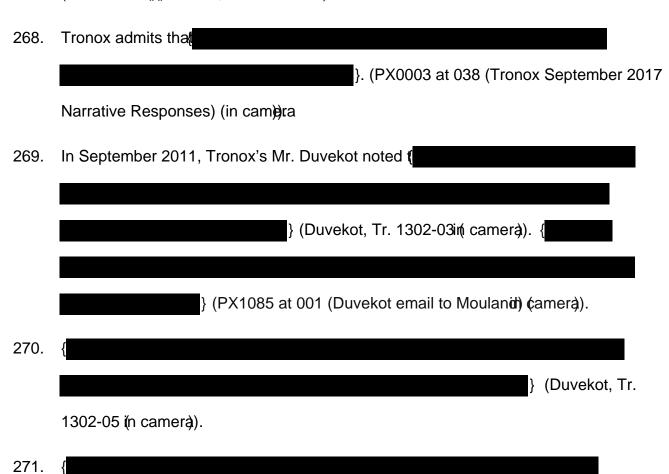
prices in the regional markets in which doe business? The answer to that question is



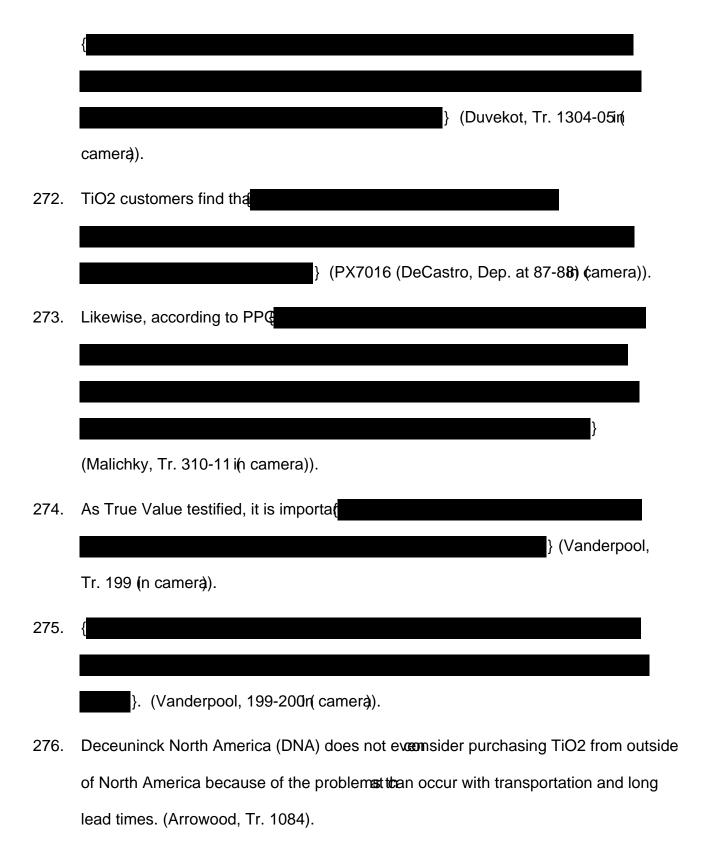
- (b) Arbitrage by customers is inadequato defeat parice increase in North America
- Within the framework of section 4.2.2, the rizontal Merger Guidelines focus on whether customers can engage in arbittage uying a product in low-priced region and the customer being responsible for arrangiang portation, duties, costs etc. to move the product tself to another region. (PX9085@17-18 (Horizontal Merger Guidelines, § 4.2.2); Hill, Tr. 1714-15, 172@uvekot, Tr. 1303-05{
- 260. Customers universally testified that they do not engage in arbitrage of chloride TiO2 in North America. \$eeCCFF ¶¶ 272-77, below).
- 261. North American customers tested that the cost of transplation and duties as well as the logistical burdens neder arbitrage not commercially viable and thousatomers in North America would not likely defeat 5-10% price increase by a hypothetical monopolist through arbitrage (SeeCCFF ¶¶ 283-89, 295-99, below).

(See CCFF ¶¶ 232-58, above; Hīlit, 1720-1725 (partiallijin camera); PX5000 at 063-064 (¶ 144 & J. (Hill Initial Report) (in camera)). There is also no evidence that North Americanstrumers purchase chloride TiO2 indirectly from or through other customers to explanting price differences. (Shehadeh, Tr. 3567).

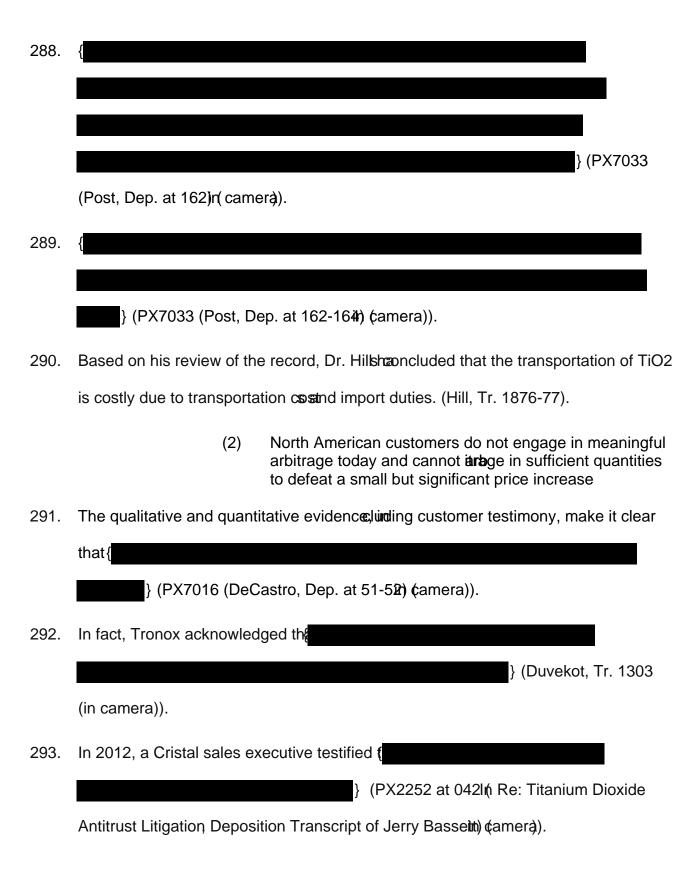
- (1) Arbitrage is expensive and impractical
- 267. For all of the reasons explainer this section, customers wild not be able to defeat a small, but significant North American chloride TiO2 price increase through arbitrage. (See CCFF ¶¶ 272-77, 283-89 below).

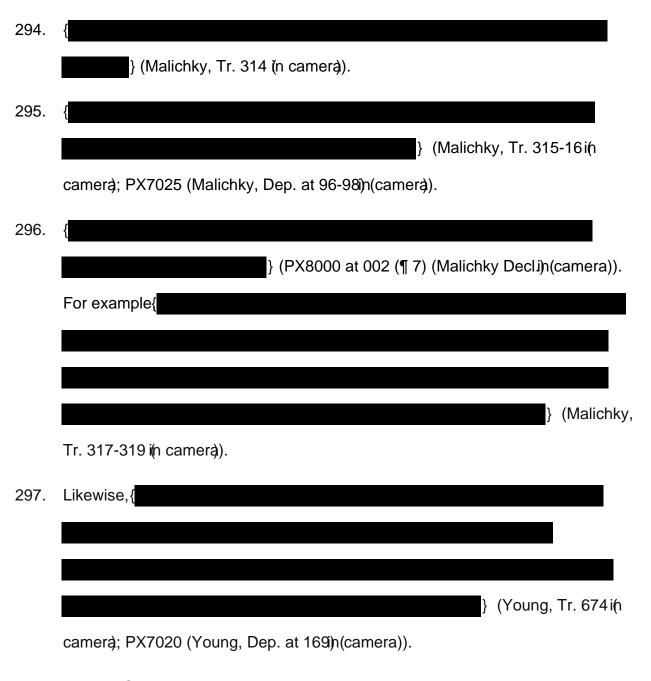


} (Duvekot, Tr. 1307in camera).



277.	{
	} (Young, Tr. 674, 735in camera).
278.	{ (PX2253 at 037ln Re:
	Titanium Dioxide Atitrust Litigation, Deposition Transcript of Michael Cartin
	camera).
279.	As Cristal's then-sales manager, Mr. Bassettplained during a deposition taken for one
	of the price fixing litigations{
	}
	(PX2252 at 051-521n) Re: Titanium Dioxide Antitrust Litigation Deposition Transcript
	of Jerry Bassett)in( camera)).
280.	{ (PX1372 at 020
	(Tronox May 2014 email with strategic plan presentation attack
	}) (in camera).
281.	For example{
	} (PX8005 at 004 (¶ 20)Maiter Decl.) (n camera).





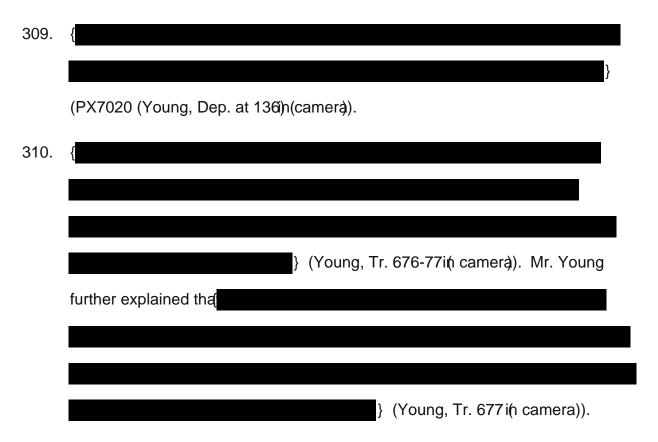
298. When TiO2 prices in North Americaere higher than those in Europæeceuninck
North America (DNA)looked into possibly moving TiO2 from one of Deceuninck's
European plants to DNA's Monroe, Ohio plantist decided not to do that because "the
cost, transportation cost, is very expensive at the titanium dioxide from Europe to the
U.S., the economics didn't make sense forous that..." (Arrowood, Tr. 1089-90).

- 299. In the last 30 years, DNA has never turne two pean or Chinese TiO2 suppliers when North American TiO2 prices have creased. (Arrowood, Tr. 1095-97).
- 300. After considering documents, testimony and engaging in an economic analysis, Dr. Hill concluded that

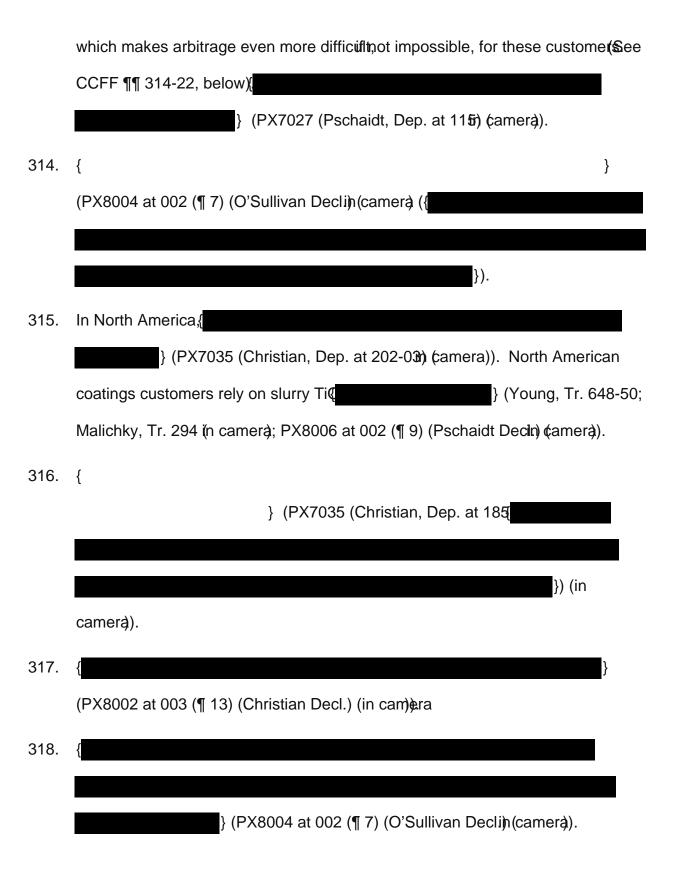
} (Hill, Tr. 1724-25 (n camera)).

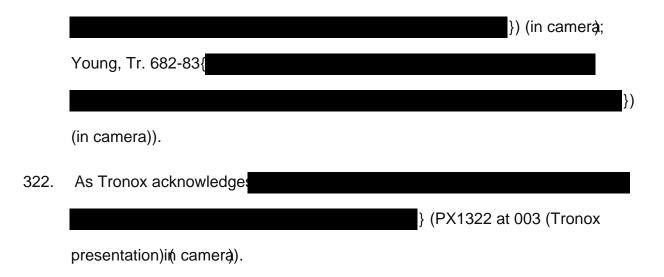
- (c) North American customers have tinct product demands and requirements
- 301. Market participants testified that TiO2 customers in North America have distinct demand characteristics that separate the NortheAiran TiO2 demand from those in other regions. (SeeCCFF ¶¶ 302-22, below)North American consumers of TiO2 value quality of TiO2 much more than customers in other overwhelmingly use chloride TiO2 in North AmericaSe(e CCFF ¶¶ 31-92, above)his makes it significantly more difficult to airthage because the TiO2 produced in other regions, much of which is sulfate TiO2, islikely to meet the stringent requirements that North American customers requires (e CCFF ¶¶ 302-12, below).
- 302. North American TiO2 customers are modesveloped and have a higher degree of technical and customer service riggments. (Christian, Tr. 786-87).

303.



- 311. Quality standards are different for South America versus North America in part because labor is cheaper in South America so repaignfirequently is not a problem. In contrast, in North America, many paint products hamelti-year warranties. Also, North America is a tint market. (PX7020 (Young, Dep. at 133-64h addition, as I mentioned earlier, North America is a tint market, so the coloansdards of the product the can have to be very, very tightly monitored and with lowlerances so that when we do inject the colorant, we get the color we anticipate at the end.")).
- 312. According to Sherwin-Williams's Mr. Young, incres are traditionally higher in North America because consumers there want higher quality painthatmet quires using chloride TiO2. (PX7020 (Young, Dep. at 141)).
- 313. In addition to requiring chloride TiO2, North America TiO2 demand is unique in that many coatings customers demand chloride TiiO2 urry form, as opposed to dry TiO2,





- iii. The Market for the Sale of ChlorideO2 to North American Customers Passes the Hypothetical Monopolist Test
- 323. The qualitative evidence discussed above is consistent with the quantitative evidence, demonstrating that the sale of chloride Tiio2North America is the relevant market.

  (SeeCCFF ¶¶ 324-29, below). The hypothetical monopolistitedicates that demand for chloride TiO2 is strong in North America and customers are unlikely to switch to sulfate TiO2 in significant amounts, in the face of a SSNSPee (CCFF ¶¶ 327-29, below, Hill, Tr. at 1698-99). Therefore, the sadechloride TiO2 to North American customers is a relevant markeSeé CCFF ¶ 329, below).
- 324. Under the Horizontal Merger Guidelinesethypothetical monopolist test is used as a framework to determine whether a maket market is properly definedPX(9085 at 011-12 (Horizontal Merger Guidelines),4.1.1)). In applying the set, the analysis focuses on whether it would be profit maximizing for hypothetical monopolist of all sales in a specific region to increase price by a teas SSNIP, commonly five percentPX(9085 at 013 (Horizontal Merger Guidelines),4.1.2)). If the hypothetical monopolist can

- successfully impose a SSNIP in the proposed market, the relevant market is defined correctly. PX9085 at 013 (Horizontal Merger Guidelin§s4.1.2)).
- 325. Critical loss analysis is a standard tooled to implement the hypothetical monopolist test to determine whether a candidate marketstitutes a relevant antitrust market.

  (PX9085 at 014-15 (Horizontal Merger Guidelin § 4.1.3) (discussing using critical loss analysis to implement the hypothetical monopolist.); Hill, Tr. at 1691). A critical loss analysis determines whether it would profitable for the hypothetical monopolist to increase the price by at least a SSN(PX9085 at 014-15 (Horizontal Merger Guidelines, § 4.1.3); PX5000 at 050 (¶ 107) (Hill Initial Repoint)camera)).
- 326. A critical loss analysis compares two quitients: (1) a critical loss, which is the percentage of sales a hypothetical monopoliosald have to lose to keep its profit unchanged if it increased its price by a SSNMIRO (2) a predicted loss, which is the percentage of sales that the hypotheticanhorpolist would likely lose if it increased its price by the same amount used in thitical loss analysis. (PX9085 at 014-15 (Horizontal Merger Guidelines, § 4.1.3); 5000 at 049 (¶ 106) (Hillnitial Report) (n camera).
- 327. Dr. Hill implemented the hypothetical monopolist test in four different ways, including using Respondents' own documents and commussito test whether chloride TiO2 sold to North American customers is a relevantiteurst market. (Hill, Tr. at 1690). Dr. Hill conducted three separate criticals analyses to test the bustness of the results. (PX5000 at 050-56 (¶¶ 108-22 & Figs. 20-22) (Hill Initial Report) (amera); Hill, Tr. at 1696-98). Each critical loss analysis used ifferent estimate of the predicted loss: (1) Dr. Hill's estimate for price elasticity of deand; (2) Respondents' estimated relationship

- 330. It is uncontested that North American Ti@2stomers cannot sultiste another product to replace their use of TiO2SeeCCFF ¶¶ 331-32, below
- 331. In fact, Tronox and Cristal have concedibate the appropriate product market is not broader than rutile TiO2. (Respondent Pre-Trial Brief at 24; RX0170 at 0142 (Shehadeh Report 246) (n camera).
- 332. TiO2 is a critical input for many producted Tronox and North American customers agree that (PX8006 at 001 (¶5)Pschaidt Decl.)in camera; PX7049 (Zamec, Dep. at 102-03) camera; PX8000 at 001 (¶4) (Malichky Decl.); PX1073 at 117 (2012 Bain Presentation to the Tronox Board) (in camera PX7002 (Mouland, IHT at 38-40)n (camera; PX8002 at 001 (¶4) (Gistian Decl.) in camera; PX8005 at 001 (¶4) (Maiter Decl.) X3011 at 012, 019 (Kronos Investor Presentation); PX9104 at 042 (Tronox 10-K) (stating "it is our belief that there is no effective mineral substitute for TiO2." Pschaidt, Tr. 978-79n (camera); Vanderpool, Tr. 174; Malichky, Tr. 273-74; PX8003 at 002 (¶6) (Young Dein). Camera; PX7034 (Septien, Dep. at 17)n (camera); PX7014 (Quinn, Dep. at 119-20)n (camera); PX1000 at 006 (2016 Tronox Strategy Documein) (amera); Arrowood, Tr. 1062 ("Without [TiO2], essentially, our faotry would be shut down.")).
- ii. Anatase TiO2 Is Not a Substitute Reutile TiO2 and Should Be Excluded
  333. Commercially produced TiO2 comes in two stalline forms: rutile and anatase.

  (PX9023 at 103 (TZMI TiO2 Pigment Annual Review: A Review of 2014); PX9020 at 013 (Chemical Economics Handbook)).

Hardness (Mohs Scale)	5.5	6.5
Colour	Yellow/White	Blue/White
Relative Hiding Power	78%	100%
Ultra-violet light Absorption	Partial	Complete
Chalking	Free	Retarded

(PX1323 at 005 (TZMI Congress Presentation) also, PX9020 at 013 (Chemical Economics Handbook); PX9023 at 103 (TZMI TiO2 Pigment Annual Review: A Review of 2014); PX0012 at 005 (Response to Fifth Request for Information) (in camera);

Christian, Tr. at 782 (Anatase TiO2sha different type of crystal.)).

338. The differences in the properties between thite and anatase crystals means they tend to be suitable for significantly different palications, and are not between the properties between the properties and anatase crystals means they tend to be suitable for significantly different palications, and are not between the properties between the properties between the properties between the properties and anatase crystals means they tend to be suitable for significantly different palications, and are not between the properties between the properties

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- "uncoated free sheet paper," and "speciphtyducts (food, pharmaceuticals, cosmetics, fibres, photocatalysts, etc.)." XP289 at 021 (TZMI presentation)).
- 342. By volume, the largest commercial apptions for TiO2 are architectural coatings, industrial coatings, and plastidse(, 86% of TiO2 world consumption). (PX9020 at 009 (Chemical Economics Handbook); PX0001 at 011 (Tronox-Cristal Joint Presentation to the FTC) ( }) (in camera); PX1323 at 008 (TZMI Congress Presentation)). Becathrese applications primarily use rutile TiO2, anatase TiO2 only accounts for 101/global TiO2 production. (PX9020 at 014 (Chemical Economics Handbook); PX9023 at 024 (TZMI TiO2 Pigment Annual Review: A Review of 2014); PX7016 (DeCastro, Dep. at

(Shehadeh, Tr. 3257-83). Dr. Shehadeh, howesverr, error as his iew contradicts the demand-centric approach laid out in the Horizontal Merger Guidelines; "Market definition focuses solely on demand substitutementors, i.e., on customers' ability and

Sandusky could likely engage in arbitragepurchasing the product in Cleveland and delivering it to its plant in Sandusky. i(I,HTr. 1732-33; PX5004 at 035 (¶¶ 81-82) (camera).

- iii. Dr. Shehadeh Wrongly Criticizes Drill Use of the North American Producer Price Index Measure the TiO2 Price
- 364. Dr. Shehadeh criticizes Dr. Hill's analyses

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data with a change in price. (PX50040at0-13 (Section 2.A.1) (IHR Rebuttal Report to Shehadeh)in camera).

- iv. Dr. Shehadeh Errs in Criticizing Dr. Hill's Decision Not to Include the Sulfate TiO2 Price in His Chloride TiO2 Demand Regressions
- of the sulfate price (Shehadeh, Tr. 3300-01). Dr. Saeleh suggests that omitting the sulfate price causes Dr. Hill to underesate the sensitivity of North American consumers to changes in the chloride price. (Strethall r. 3300-01).

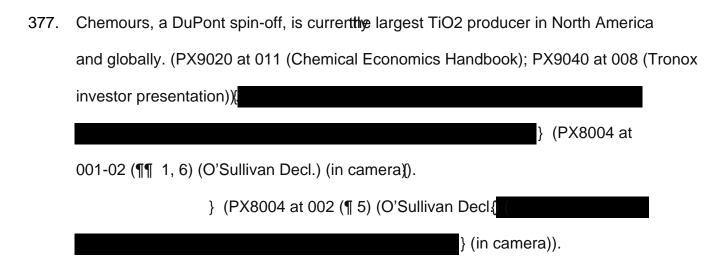
373. Dr. Shehadeh's conclusions are incorrects. Dr. Hill shows in his Rebuttal Report and its backup materials, analyses that controls footomer and grade nevertheless show that the average price in North America was higher a substantial period of time. (PX5004 at 073 (Appendix E) (Hill Reputtal Report to Shehadehin) (camera).

## IV. MARKET STRUCTURE

- A. The North American Chloride TiO2 Meet Is Already Highly Concentrated
- 374. The market for sales of chloride TiO2 in North America is highly concentrated, and would become significantly more concentrated as a result of the Acquisties QCFF ¶¶ 375-81, below).
  - i. There Are Five Major Producers in the Relevant Market

375.	The North American chloride TiO2 market
	} (Vanderpool, Tr.
	185; Malichky, Tr. 313-14iւի camera); Christian, Tr. 817-18ո(camera);PX1230 at
	019 (Tronox presentation∦ (
	}) (in camera). These five producers account for
	over{ over{ notation of chloride TiO2 sales in NortAmerica. (PX500@at 010, 067-68 (¶¶ 13,
	152 & Fig. 25) (Hill Initial Report) i( camera).

376. Tronox, Cristal, Chemours, Kronos, and Venator accour of North America TiO2 production capacity. (PX5000 at 026-(¶ 59 & Fig. 9) (Hill Initial Report) (in camera). All North American TiO2 production is the tion of a small Kronos-owned sulfate TiO2 plant@anada. (PX5000 at 025-26 (¶ 59 & Fig. 9) (Hill Initial Report) (in camera).



378. The two other major North American Ti@2mpanies—Kronos and Venator—jointly own a 50-50 joint venture that expates a chloride TiO2 plaimt Lake Charles, Louisiana, with each company entitled to half ofetfacility's output. (PX8002 at 002 (¶ 7) (Christian Decl.)(in camera) PX8005 at 002 (¶ 10) (Maiter Decl.); Christian, Tr. 751-53). Outside of the United States, Kronos and Venator produce both chloride TiO2

- 380. In addition to its one-half ownership of the disiana facility, Venato, a Huntsman spin-off, operates six TiO2 plants in Europædaone plant in Asia. (PX8005 at 001-02 (¶¶ 1, 9) (Maiter Decl.)). Other ten the Louisiana facility, onlyine of Venator's plants makes chloride TiO2. (PX8005 at 002 11) (Maiter Decl.)).
- 381. While Venator is one of the largest TiO2 companies in the world by capacity, its presence in North America is the smallest amone five major North American producers.

  (PX7015 (Maiter, Dep. at 60); PX89 at 006 (¶ 26) (Young Declin(camera); PX9040 at 008 (Tronox investor prestantion)). Unlike the other four major North American producers, Venator does not have any TiQu2rs Icapacity in North America. (PX7015 (Maiter, Dep. at 53-54, 60); Young, Tr. 660 (amera); Pschaidt, Tr. 996 (camera); Malichky, Tr. 609 (n camera).
  - ii. Other Producers Have Minimal ChlorideO2 Sales to North American Customers and Are Not Rapid Entrants
- Outside of the five major producers, other churcers have de minimis sales of chloride

  TiO2 in North America; those sales are indued in the relevant market and account for a combined market share of less the combined to a few Chinese than the five major conducers, chloride TiO2 production is limited to a few Chinese producers, Ishiharralapan, and KMML, a small producer in India. (PX1532 at 020 (TZMI Cost Study)) These other producers account for only of worldwide chloride TiO2 capacit (PX5000 at 020-21 (49 & Fig. 3) (Hill Report) (in camera); PX1532 at 051 (TZMI Cost Study)).
- 383. The Horizontal Merger Guidelines considents that do not sell into the relevant market but who "would very likely provide rapid supply responses with direct competitive

impact in the event of a SSNIP" to be metricarticipants because they are "rapid entrants." (PX9085 at 018-19 of Indicated Merger Guidelines, § 5.1)). In that case, the Horizontal Merger Guidelines may consider calculating shares for those firms not based on actual sales in the relevant market, beteldeon capacities or reses, but "only if a measure of their competitive significant potenty comparable to that of current producers is available," and even then market shares are measured based on firms' readily available capacities, the Agentical not include capacity that is committed or so profitably employed outside the relevant market, brightneocost, that it would not likely be used to respond to a SSNIRhine relevant market." (PX9085 at 018-19 (Horizontal Merger Guidelines, § 5.2.)).

- 384. The Chinese chloride TiO2 producers, Instita, and KMML do not meet this "rapid entrants" standard under the Horizontal Merger Galindes because they could not "easily and rapidly" begin selling a meaningful amount chloride TiO2 to customers in North America, they are not "very likely [top]rovide rapid supply responses with direct competitive impact in the event of a SSNIBrid they do not have "readily available" capacity to supply significant volumes of chloride TiO2 to North America. (PX9085 at 018-19 (Horizontal Merger Guidelines, § 5.4 PECCFF ¶¶ 385-89, below).
- 385. Although a few Chinese manufacturers have riddle TiO2 production capacity, chloride TiO2 from Chinese producers does not have eaningful competitive presence in North America. SeeCCFF ¶¶ 747-807, below; PX7037 (Pickett, Dep. at 57/{

}) (in camerà; PX7052 (O'Sullivan, Dep. at 174

(TZMI Cost Study)). Ishihara therefore doesot "clearly possess the necessary assets to supply into the relevant market," nor do they have "efficient" readily available" capacity to supply North America. (PX9085019 (Horizontal Merger Guidelines, § 5.1)).

- 388. KMML is a small producer of chloride TiO2 **In**dia that is reporte to have an annual capacity of 40,000 tonnes. (PX1532 at 151 (TZMI Cost Study)). According to TZMI, KMML is one the world's highestost producers of chloride TiO2(PX1532 at 083 (TZMI Cost Study)). Tronox reports that r Mhat r Mhat r Mhat r Mhat (tho1e,250 s5Tj 0 1lw100).
  - }, which limits the availability of KMML's small-scale production for export. (PX1012 at 065 (TronoxiO2 Strategic Plan 2017)n(camera)). As a small, high cost producer of TiO2, in a region with growing demand, KMML therefore is not a "rapid entrant" into the North American market for TiO2. (PX9085 at 019 (Horizontal Merger Guidelines, § 5.1)).

Initial Report) (n camera		
<del></del>		

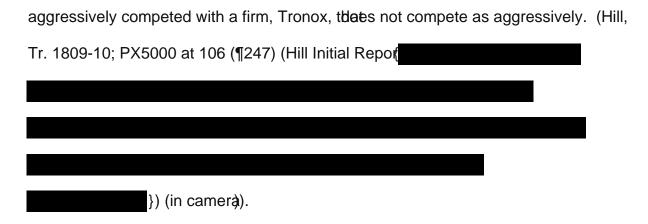
) (PX8002 at 004 (¶ 19) (Christian Decl.) (in cam)era

PX8004 at 002-03 (¶ 9) (O'Sullivan Declin) (camera); PX8003 at 003 (¶ 14) (Young Decl.) (in camera).

396. Outside of the five major producers, the ot

\_\_\_

400. As Dr. Hill testified, the Horizontal Merger Gu



- i. The North American Chloride TiO\(\mathbb{D}\) arket Is Already Vulnerable to Coordination
  - (a) The number of firms in the relevant market is small
- 403. The North American market for chloride TiO2 is highly concentrated and the merger will significantly increase that concentration. (Hill, Tr. 1800). As Dr. Hill concluded in his expert report, "[c]oordination is nore likely to occur when the number of firms who must be involved for it to be effective is sitted. Coordination of any kind involves communication, and the larger the number of firms, the greater the possibility for misunderstandings. Thus, the smaller is ritumber of firms, the easier it typically is to coordinate." (PX5000 at 096 (¶ 219) (Hilltlal Report) (n camera)).
- 404. There are five major producers of chlorite 2 in North America: Tronox, Cristal, Chemours, Kronos, and Venator, which together account for over 99% of chloride TiO2 sales in North America. (Hill, Tr. 1804) The acquisition of Cristal by Tronox will reduce the number of majorquiucers of chloride TiO2 in North America from five to four. Post-merger two firms would control 73% 75% of the North American chloride TiO2 market. (Hill, Tr. 1804 see CCFF, supra

405. Based on his review of the record, Dr. Hill obseed that producers in the relevant market exhibit mutual interdependence: "Reviewing information from the parties and from third parties, I concluded that it in this industry are well as that their actions affect one another, that they are mutually intermediate." (Hill, Tr. 1801; PX9085 at 027 (Horizontal Merger Guidelines, § 7) Coordinated interation involves conduct by

411. Finally, in reviewing information from the parties and from third parties, Dr. Hill

419.	In the same email to Tronox's Board membfollowing the December price increase
	announcement, Mr. Casey explain
	} (PX1047 at 001 (Casey email to Tronox Board
	members)i(n camera).
420.	From Cristal's perspective the December 2015 price increase announcements were
	{ (PX2055 at 022 (Cristal presentation)
	(in camera)). {
	}
	(PX2216 at 001 (Nahas email to VanValkenburġm)c(amera).
421.	On the same day Tronox announced its price increase in December 2015, a Cristal
	executive anticipated in an internal eintlaat other TiO2 producers would follow

Tronox's increase: "Tronox follows the tre. Tronox also[] announces global increase

425.	In October 2016, following a publically announce price increase by a competitor, Mr.
	Gigou, Cristal's sales vice pident, wrote of the announcedice increase to other
	Cristal senior executive
	}, to which Mr. Gunther, Cristal's head of TiO2 business, respo
	} (PX2007 at 001 (Gigou email to
	Gunther) (n camera).
426.	Further, the major North American children TiO2 producers over the years have
	increased TiO2 prices typically in clopsoximity to each other in time. (PX1204
	(December 2016 Tronox Excel spreadsh(
	(in camera); Pschaidt, Tr. 975 ("Usuallyetfio2 manufacturers announce price
	increases very close to eaother, so it normally is announced within a short period of
	time of each other."); Malichky, Tr. 328, 33
	}) (in
	camera; PX8003 at 006 (¶ 29) (Young Decl.); 8001 at 003 (¶ 17) (Zamac Declir) (

example, in early 2016	
	}, Mr. Duvekot of Tronox explained that
{	
} Mr. Duvekot further explain	ned th
	} (PX1435 at 001 (Duvekot email)
(in camera); Duvekot, Tr. 1333-35n(	(camerà).

- 428. In fact, what Mr. Duvekot explained wishat, in early 2015, Tronox's Mr. Casey had projected would happen: "It is our view that upward move in pigment selling prices will be predicated on a reduction of supplythine pigment market relative to demand and/or upward move in feedstock sellingcips and we expect to see both." (PX9007 at 005 (Tronox Q1 2015 Earnin@all); Arndt, Tr. 1363-64).
- A few months later, in Tronox's 2015 third appear earnings call, Mr. Casey disclosed that Tronox had idled a portion its TiO2 production, emphasizing the impact of this decision on pricing, and emphasizing hown observed other TiO2 producers "acting in the same way": "And the question is, when it interest turn? We're addressing that by managing our production so that interest get reduced to normal or below normal levels. And when that happens, prive strise. We -- from what we see with Chemours and Huntsman and presumably other well, they're doing the same thing. We see them acting in the same way PX9005 at 010 (Tronox Q3 2015 Earnings Call)).
- 430. In 2015, shortly after Mr. Casey had publically ated that Tronox Indialed part of its Hamilton plant.

- PX2055 at 024 (Criat presentation)in camera)). And Tronox cheered these developments as "Good news!!" withonox's then-CEO Mr. Casey remarking "[i]t's good that [Chemours] can follow theader!" (PX1325 (Caseymail to the Tronox senior executive team)).
- A31. Cristal also has observed theto be discipline in TiOproducers' decisions to reduce TiO2 capacity. In a September 2011 emaitstal's Mr. Stoll wote: "The pricing momentum began when significant majapacity was taken off line in 2008 and 2009 during the Financial Crisis. More than 300,000mt came off-line in this period, including Le Havre and Hawkins Point. . . . The maskwetent from a vergover-supplied situation for many years to a more balanced to tighter ario where growth then started to exceed supply. This discipline of taing supply off-line and allowing inventories to fall as demand improved lead [sic] to pricing distine and pricing powerover the following quarters. . . . However, over the next several this we are going to really see if the industry can maintain market discipline debal demand stalls going into a seasonally low period." (PX2083 at 001 (Stoll email to Najjar)).
- 432. Cristal's emphasis on adjusting TiO2 product limit competition is long-standing.

  As described in a strategic plan review fo

- (c) The mutually recognized interdendence among North American TiO2 producers is reflected in their efforts to maintain "discipline" and avoid triggering competitive responses
- 433. Tronox and Cristal documents repeatedly demonstrate mutually accommodating conduct by chloride TiO2 producers with the imition to support market disciplineSée CCFF ¶¶ 434-41, below). As Mr. Casey has publiclescribed: "As you saw, we have not gained market share by trying to reduce price. We don't think that's the appropriate strategy going forward . . . ." (PX9010 at 005 (Tronox Q2 2014 Earnings Call)).

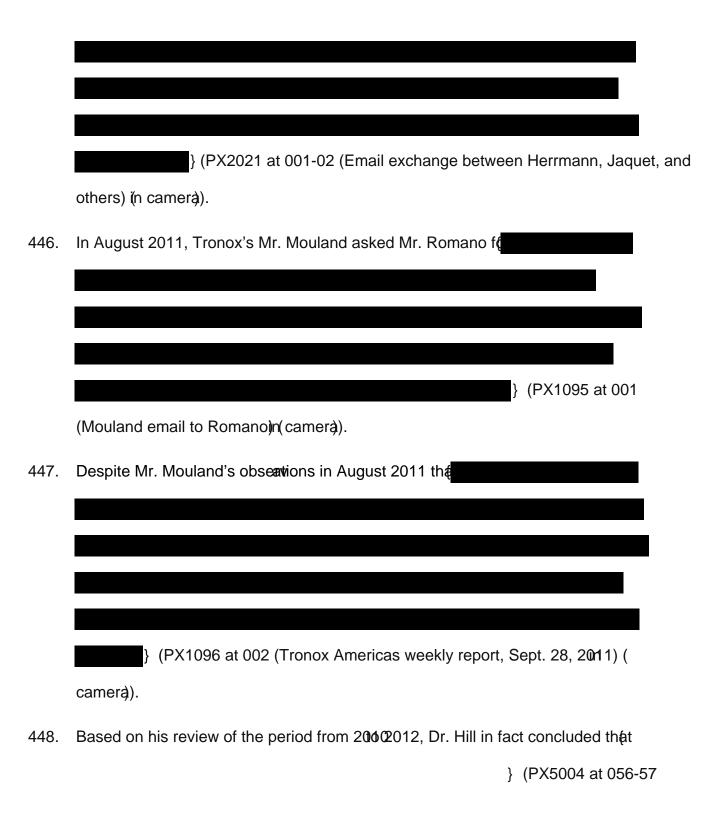
434.	For example, when Mr. Casey asked Mr. Romano in 2011 to ex
	(PX1090 at 001 (Romano email to Casew)camera)

435. In a similar July 2012 email, Mr. Romanowie to Mr. Casey, then-CEO of Tronox and Mr. Greenwell then-CFO that

	} (PX6000 at 003 (Stoll email to Nahais) ¢amera)).
440.	{
	) (PX2247 at 155-56
	(Valspar v. Millennium Inorganic Chemicæls al. multidistrict price fixing litigation
	Deposition Transcript Mark Stoll) (n camera).
441.	Similarly, Mr. Stoll was asked during the aryland price fixing itigation about an
	internal 2007 memo from Cristal's JohnlHawhich had the following guidance relating
	to TiO2 price: { PX6023 at
	002 (Hall email to Stoll and others) camera)). {

}) (PX2245 at 048 (In Re: Titanium DioxeidAntitrust Litigation, Deposition

Transcript of Mark Stoll) (in came)

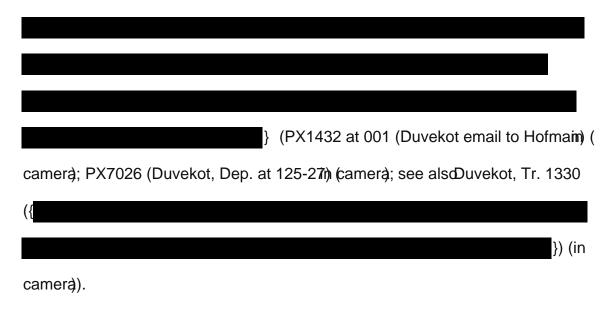


449.	As demand waned in the period after 20
	. (See
	CCFF ¶¶ 450-59, below).
450.	For example, in a 2014 presentation regarding Tronox's sales and marketing strategy,
	{
	) (PX1016 at 062
	(Tronox presentation)
	}) (in camera).
451.	During the second half of 2014, Tronox had an opportunity to secure new business at
	{
	} (PX1086 at 002-03
	(Romano email to Duvekot, Mouland, and Doherity)c(amera). {
	(Nomano email to Duvekot, Modiand, and Donerby) Qamera). (
	1 (DV407C at 004 (Dahartarasil to Mayland)
	} (PX1076 at 001 (Dohe,rtemail to Mouland)
	(in camera)).
452.	Similarly, Tronox's Mr. Duvekotecommended for a salesdamarketing presentation
	that Tronox focus of
	\ (PX1360 at 001

(Duvekot email to Romano)n(camera); PX7026 (Duvekot, Dep. at 111-12
}) (in camera); see alsoPX1030 at 013 (Tronox presentation) (
}) (in camera).

453. When Mr. Duvekot was asked in his deposition

}



456. In August 2015, Mr. Romano, Tronox's Ch@ommercial Officer, wrote while approving a price request

	} (PX1077 at 001 (Mouland email)n(camera)).
<del>1</del> 59.	Further, Tronox's 2017 Strategic Plan, datedheu 2016, captures the approach that
	Tronox has developed { }: {
	}
	(PX1091 at 016 (Tronox TiO2 Strategic Plan 2017) (in cames; alsoRomano, Tr.
	2163 (
	}) (in camera; PX9010 at 005 (Tronox Q2 2014 Earnings Caths you
	saw, we have not gained market share byingto reduce price. We don't think that's
	the appropriate strateggoing forward ")).

- (d) TiO2 producers are able to observe each other's competitive actions; i.e., the relevant market is transparent
- important firm's significant competitive inattives can be promptly and confidently observed by that firm's rivals." (PX9085@29 (Horizontal Merger Guidelines, § 7.2)). The North American chloride TiO2 market exits the kind of competitive transparency that facilitates coordination by allowing "signifant competitive initiatives" of rival firms to "be promptly and confidently observed by that firm's rivals?X\(\text{9085}\) at 029 (Horizontal Merger Guidelines, \(\xi\) 7;\(27\)X5000 at 096 (\(\frac{1}{221}\)) (Hill Initial Reportin( camera); Hill, Tr. 1804-05).
- 461. TiO2 producers routinely develop detailed brmation about competitive initiatives by other producers and anticipatompetitive response They accomplish this through

**PUBLIC** 

initiatives of these other producers. (PX9085 at 029 (Horizontal Merger Guidelines, § 7.2); Arndt, Tr. 1360-61 (When dissing its quarterly results, Tronox discusses changes in sales volume, margin information, and operation related intimmauch as plant utilization rate and inventorlevels); PX5000 at 096-97 (¶¶ 22

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Chemours inventory situation); Romano, **21**42-44; PX1054 at 001-04 (Engle email to Romano, Duvekot, Mouland) (describing "tidbits" from Huntsman transcript relating to inventories and utilization); PX2051 at 001 (Stoll email to Nahas)s(fitteresting being here at the TZMI Conference this week in

- camera; PX2062 at 001-15 (Cristal competitearnings call analysis, May 2017) (camera; PX2278 at 004-14 (Cristal competitemofitability analysis, Mar. 2013)).
- 469. Cristal considers the investoalls of TiO2 competitors meaningful enough that key executives listen to the calls, and the campdistributes summaries of the calls.

  (PX2049 at 001-04 (Stoll email to Trabzurf

email relating to Tronox and Chemours 2@±6nings calls with "Key Messages" relating to projected pricing winventories, and motivatin for price increases during 2017); PX2269 at 001 (Cristal email relating tompetitor earnings results describing, among other things, lower capacity utilization (summarizing key comments from competitors' earnings calls on price increase announcements and implementation, inventory levis, plant utilization rates, and expectation for future pricing)).

- 470. Like other TiO2 producers, Tronox's public disclosures include competitive information such as margin information, sales infantion, plant utilization and inventory information. (Arndt, Tr. 1361, 1369-70).
- decisions with an emphasis on the forwardking steps it was taking to support higher TiO2 pricing Specifically, Mr. Casey\(\text{Tronox}\) ronox's then-Chairman and CEO projected the company's expectation of reduced supply of TiO2t would lead to increased pricing:

  "It is our view that an upward move in pigment selling prices will be predicated on a reduction of supply in the pigment marketative to demand and/or upward move in

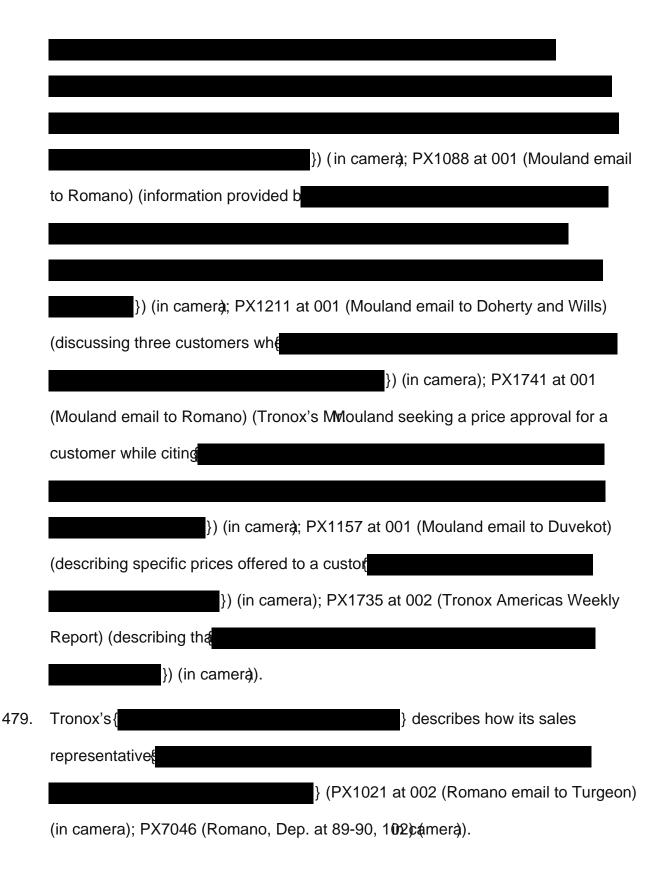
feedstock selling prices and we explect be both." (PX9007 at 005 (Tronox Q1 2015 Earnings Call)). Shortly after the **Q10**15 earnings call, Tronox publicly announced its decision to reduce production at two of **This**2 pigment plants, Hamilton and Kwinana. (PX9006 at 003 (Tronox Q2 2015 Earnings C(AP) roduction has been suspended at one of our six processing lines in Hamilton and **online** ur four processing lines at Kwinana, both of which are pigment plants. Togeth peep processing line curtailments represent approximately 15% of total pigment production.")).

In Tronox's Q3 2015 earnings call, after redupproduction at two TiO2 pigment plants, 472. Mr. Casey described how Tronwas addressing the questitwhen the prices turn" by "managing our production," and added an observation about Tronox's TiO2 competitors: "And then the question is, when will the ynd? We're addressing that by managing our production, so that inventories treduced to normal or low normal levels. And when that happens, prices will rise. We -- frowhat we see with Chemours and Huntsman and presumably the others as well, they're doting same thing. We see them acting in the same way." (PX9005 at 010 (Tronox Q3 2015 Earnings Salle);alsdPX9005 at 002 (Tronox Q3 2015 Earnings Call) ("Industry supply and demand will return to balance. The obvious question is, when? And I can't to that because I can't speak for the industry as a whole. However, I can tell you that we are reducingnventory, freeing up working capital, generating cash, and acreating the return to supply-demand balance. From their public announcements baleeve others at botthe feedstock and the pigment levels are doing the same thiso, we're optimistick but the return to a more normal market conditions in TiO2.")).

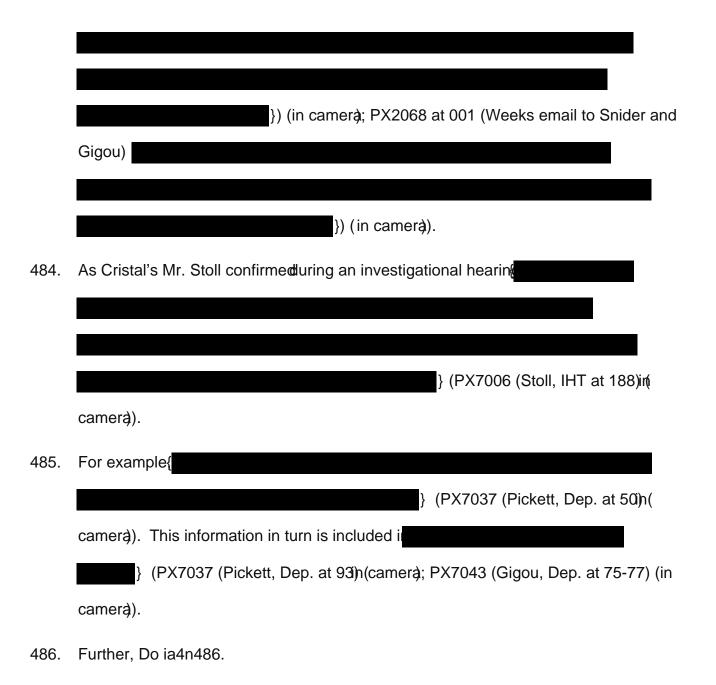
- 473. In its Q1 2016 earnings call, Mr. Casellowed up by emphasizing Tronox would seek to manage production at its Hamilton plant in a disciplined manner: "We believe that a very disciplined approach to production managing supply relative to demand, is what has facilitated the recovery onur markets, and we intend continue to disciplined about that. So, we don't intend to bring ballow full production instantaneously simply because we see the very first signs of exprecovery." (PX9003 at 010 (Tronox Q1 2016 Earnings Call)).
- 474. Further, in its Q1 2016 earngs call, Tronox also disesed actions taken by other producers to reduce TiO2 output: "I call the uthat I thought last year Huntsman, I believe Cristal, Chemours, and we all lowered our plant utilizations, and we all talked about declining irentories which we had set as algo hat is that we wanted to reduce inventories. Clearly, the way that reduces inventions is one reduces production and continues to maintain sales, this what we all tried to do." (PX9003 at 008 (Q1 2016 Tronox Earnings Call)).
- Dr. Shehadeh was asked in several diffeinestances at trial whether he had even considered public disclosures of Tronox, and denitted that he had not. (Shehadeh, Tr. 3584-85 ("Q. You didn't rely on PX 9001 for opinions in this case, did you, Dr. Shehadeh? A. I did not." (quoting Trox's Mr. Casey in PX9001 at 009 ["So the question for us is, do we confront China opuced supply in the market as a competitive alternative to our supply? Arads I've said, we don't."] see also Shehadeh, Tr. 3540-41 (did not consider PX9007, Q1 2015 Tronox Erags Call); Shehadeh, Tr. 3541-42 (did not consider PX9003 (Q1 2016 Tronox Erani Qasl); Shehadeh, Tr. 3543-44 (did not

consider PX9005, Q3 2015 Tronox Earnings Call); Shehadeh, Tr. 3562-63 (did not consider PX9008, Q4 2014 Tronox Earnings Call)).

	(2) TiO2 producers gather competitive pricing information
476.	Tronox and Cristal salespresentatives obta{
	} (Romano, Tr. 2154-55see CCFF ¶¶ 477-88,
	below). {
	} (PX2368 at 001-05 (Cristal Ntth America Weekly Report)r(camera);
	Mouland, Tr. 1145-46; PX7001 (Rnano, IHT at 155-56) r(camera). {
	}
	(Mouland, Tr. 1155-56in camera).
477.	This competitive intelligence is obtained fre
	} (PX2068 at 001 (Weeks email to Snider and Gigiorus); emera); PX2069 at
	003 (Cristal Price Decision Formin (camera); PX1050 at 001 (Mouland email to
	Romano) (describing pricin{



480.	As Tronox's Mr. Romano acknowledged, Tronox do€
	} (PX7001 (Romano, IHT at 171i)n(camerà;
	PX7046 (Romano, Dep at 89-90) (camera). {
	} (PX7046 (Romano, Dep. at 85-86) ¢amerà).
481.	As Tronox's Mr. Mouland, a vice psident of sales, explaine
	} (PX7002 (Mouland,
	IHT at 13-14); PX7002 (Moulad, IHT at 84) (discussin
	}) (in camerà; PX7022 (Mouland, Dep. at 58)
	({
	}) (in camera).
482.	In one email exchange, a Tronox sales mana
	}
	(PX1434 at 001-02 (Bondt email)n tructing a sales agent
	} and
	urging the salesperson {
	}) (emphasis in original) in (camera).
483.	Cristal's contemporaneous business documidates demonstrates
	(PX2065 at 001 (Florville email to
	Parks)({



```
}) (in camera)).

487. Cristal's {

(PX7010 (Snider, Dep. at 33-34)) (camera)). Much of the market intelligence

{

} (PX7009 (Stoll, Dep. at 165))n(camera)).

488. {
```

	} (See CCFF ¶¶ 491-92,
	below).
491.	In April 2016, Tronox's Mr. Grober summarized what he hastarned following an April
	2016 conference call with
	} (PX1178 at 002 (Grobler email to
	Romano) i(n camera); PX7001 (Romano, IHT at 198) (in camera)
492.	Again, in June and August 2016, Mr. Grobile ported to Mr. Ronano summarizing what
	Tronox learned from June/Augu2016 teleconferences wit
	) (PX1187 at
	002 (Grobler email to Romano) (in camera); PX1306 at 002 (Gerhard email to Romano
	(in camera); PX1307 at 001 (Gerhard email to Romaimo)a(mera).
	(e) Products in the North American childe TiO2 market are relatively homogenous
493.	Tronox documents and testimony descr
	(PX1004 at 015 (Tronox presentation
	}) (in camera); PX0016 at 026 (Tronox White Paper)camera; PX7014
	(Quinn, Dep. at 38)in camera); PX7041 (Veazey, IHT at 46) camera; PX7036
	(Keegel, Dep. at 110)r(camerà ({
494.	{
	} (PX7052 (O'Sullivan, Dep. at 31-32)n(camera).
	Moreover,{

} (PX7052 (O'Sullivan, Dep. at 29) (

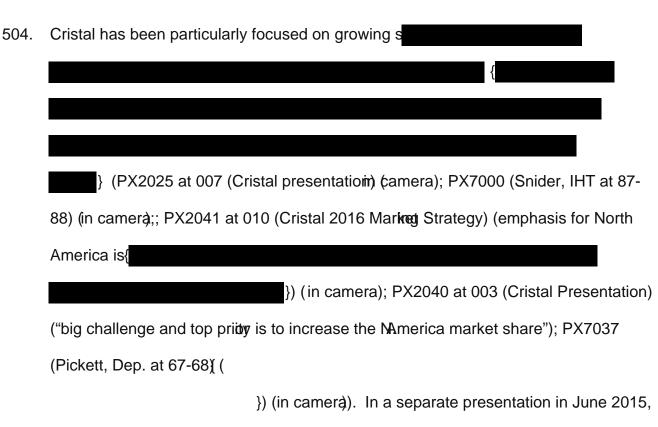
- were to rise, few sales would be lost, white the reward or coordinating greater. (Hill, Tr. 1803-04).
- After conducting quantitative analysis, Dr. Höbncluded that therice elasticity of demand for chloride TiO2 in North Americalow. (Hill, Tr. 1803). As detailed in Appendix C.2 of his initial expert report, Drill calculated that demand for chloride TiO2 in North America is highly inelais. (Hill, Tr. 1803-04; PX5000 at 051-052, 099 (¶¶ 113, 230) (Hill litial Report) (n camera).
  - ii. The Merger Would Likely Enhance That Inerability and Facilitate Future Coordination
- Following the Horizontal Merger Guidelines analysis, Dr. Hill concluded that a merger of Tronox and Cristal would increase the likeliod of coordination in the North American market for chloride TiO2. The mergerllwieduce the complexity of coordination, increase transparency between industry playeds remove a firm in Cristal with a stated plan to compete more vigorously. (PX5000 at 101 (¶ 235) (Hill Initial Repiort) (camera; Hill, Tr. 1758-59, 1809-10).
  - (a) Eliminating a firm makes coordination easier for the remaining firms in a market
- 501. Dr. Hill, following the Horizontal Merger Guizdines analysis, concluded that the merger would simplify coordination by eliminating current competitor while also creating a new firm of a similar size to Chemoursetburrent market leader. (PX5000 at 101 (¶ 236) (Hill Initial Report) (n camera); Hill, Tr. 1809-11) ("Q. And what is your basis for the determination that the merger will reduce themplexity of coordination? A. So I think there are two essential bases. The isrit will reduce the number of firms from

five to four, which reduces the complexity of particularly tacit also potentially explicit coordination.").

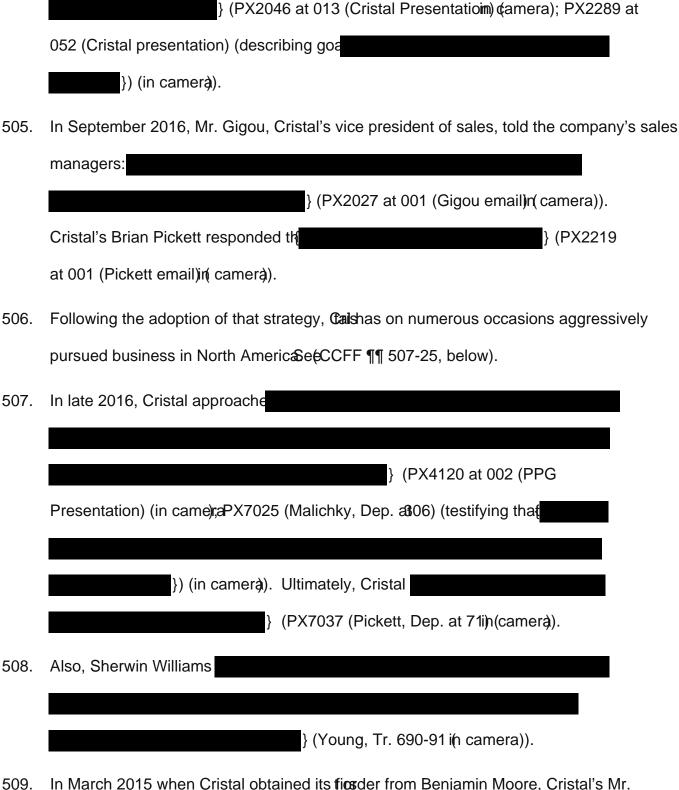
502. The merger will not merely remove a competitor, but, in Cristal, a competitor intent on trying to grow its share of the North Americamloride TiO2 market with lower prices in recent years SeeCCFF ¶¶ 503-05, below).

(b) The merger would eliminate the inact of competition from Cristal

In November 2014, when Tronox's Mr. Casey was deixogihow Tronox was not interested in reducing price to try to get marek share and move more tonine (\$P:X2037 at 002 (Stoll email to Gillette))

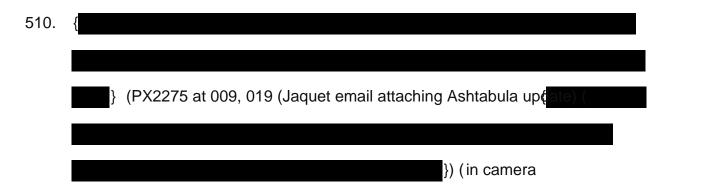


Cristal announce



9. In March 2015 when Cristal obtained its fiorder from Benjamin Moore, Cristal's Mr. Gigou reported that "we have finally managedbreak through at Benjamin Moore, one

of the largest and most respectful [sic] coatings account in North America." To this news, Jamal Nahas, Cristal's then-Presidensprended: "This is great & will increase our market share in America as planned." (PX2233 at 001-02 (Gigou email to Van Valkenburgh)).



} (PX1037 at 001 (Mouland email)n(

camera); PX7002 (Mouland, IHT at 185-86in(camera)).

523.	In a Tronox call report describing consetions and meetings wit
	Terry Doherty wrote that with
	not only { } {
	(PX1302 at 001 (Tronox call reportit) (camera); Mouland, Tr. 1195-98n(
	camera).
524.	For example, a Huntsman
	document from 2016
	} (PX3028 at 008
	(Huntsman Presentation) (camera).
525.	{
	} (PX8003 at 007 (¶ 34)
	(Young Decl.) (n camera); Young, Tr. 690-91n(camera)).
526.	Dr. Hill concluded tha
	} (PX5000 at 103-04 (¶ 2¾2Hill Initial Report) (in camera).
527.	Further,{
	}
	including the documents and statements und its decisio
	(PX1435 at 001 (Duvekot email(

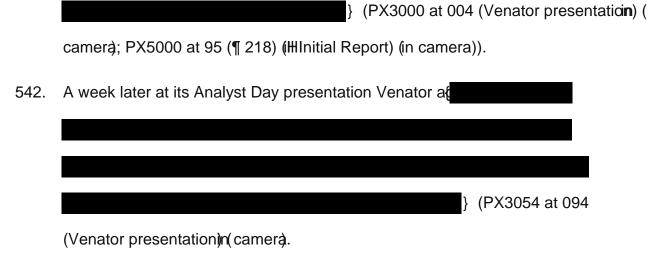
	}) (in camera);see more generallyronox's
	continuing emphasis of
	CCFF ¶¶ 528-35, below).
528.	An array of documents reflect that Tronox approach. In a 2013 email, Mr. Duvekot
	wrote:{
	} (PX1430 at 001 (Duvekot email)n(camera); Duvekot,
	Tr. 1326-27 i(n camera); PX7026 (Duvekot, Dep. at 109)n (camera)). In a 2015 email,
	Mr. Duvekot wrote tdMr. Mouland that
	} (PX1448 at 001 (Duvekot email
	to Mouland) (n camera)).
529.	When prospective customers have as
	} In an email discussing
	} Mr. Romano noted that
	{
	} (PX1158 at 001 (Mouland email) (in cam)gr®X7002

530. In a July 2015 email exchange, Mr. Duve

	} (PX1018 at 004 (Mouland performance review) (
	camera); PX7002 (Mouland, IHT at 111-13in(camera)). In a February 2017 email,
	Mr. Mouland wrote(
	(PX1215 at 008 (Mouland email to Romanion) (amera; PX7002
	(Mouland, IHT at 118-19)in camera)).
33.	In February 2017
	} In a follow up email abou
	) (PX1099 at 001 (Email examge between Mouland and
	Romano) i(n camerà).
34.	Finally, in March 2017, Mr. Muland wrote to a Tronox sales manager, Adrian Santos
	responding to a call report Mr. Santos waitten about a meeting with a potential
	customer, which included not only
	} Mr.

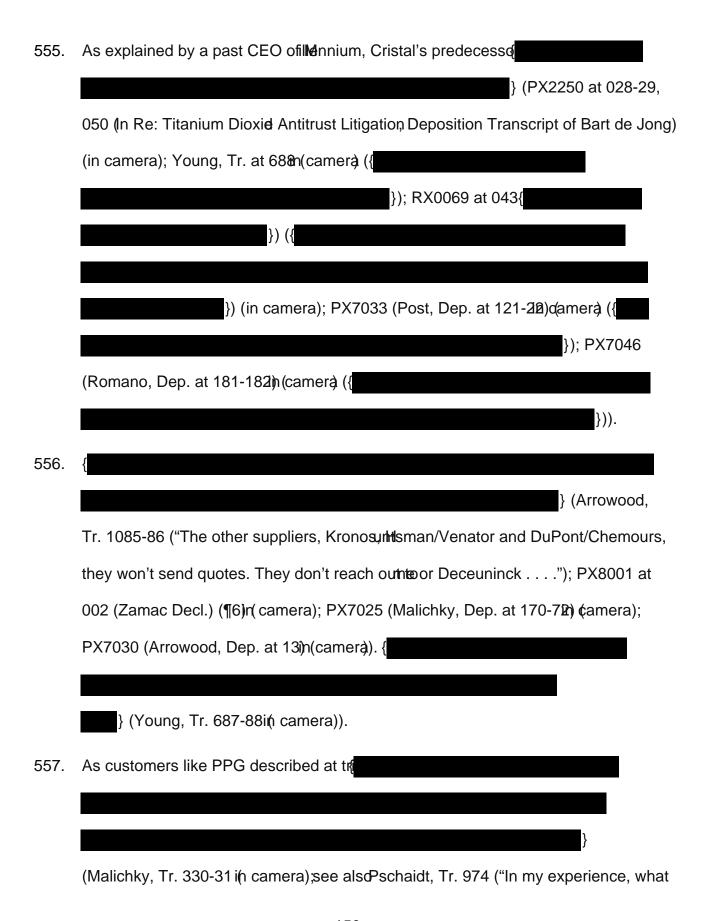
off from Huntsman and became its own pullylitraded company. (PX8005 at 001 (¶ 1) (Maiter Decl.)).

539. The recent spinoffs of Chemours from Point and Venator from Huntsman have increased the ability to mon



In a September 2017 presentation to stroves, Kronos highlighted "Industry Consolidation and Recent Independence exacting [chloride TiO2] Players." Kronos went further noting "Improving TiO2 focus across [the jidustry" meaning a greater percentage of each firms business was tied to fig it had been in the past5rfore the spinoffs of Venator and Chemours and phosposed merger of Tronox and Cristal. (PX3011 at 020 (Kronos investor presentation)).

544.



- 567. Finally, consistent with the Merger Guidreds' factors, North American customer demand for chloride TiO2 is highly inelastic. (PX5000 at 051-52 (¶113) (Hill Initial Report)(in camera). After conducting quantitative allysis, Dr. Hill found that North American customers are unlikely to substitute at TiO2 or stop wisg TiO2 altogether even if prices for chloride TiO2 were tisse significantly. (Hil, Tr. 1692; PX5000 at 051 (¶113) (Hill Initial Report)(in camera). Those results are consistent with the comments and behavior of chloride TiO2 roducers and customersSe@ CCFF ¶¶ 111-33, above).
  - ii. TiO2 Producers Recognize that Withholding Chloride TiO2 Output Supports Higher Prices
    - (a) Tronox's public statements and intel correspondence demonstrate that the company recognizes that the holding chloride TiO2 output supports higher prices
- 568. Given this market context where prices targely determined by supply and demand, it is not surprising that the Respondents at the prochloride TiO2 suppliers recognize the benefits of strategically witholding chloride TiO2 output in North America to increase prices relative to what others would have prevailed See CCFF ¶¶ 569-85, below).
- 569. Tronox has made repeated public statementsithwithholds chloride TiO2 from the North American market to affect peic(PX9003 at 010-11 (Tronox Q1 2016 Earnings Call); PX9005 at 009-10 (Tronox Q3 2015 Earnings Call); PX9007 at 005 (Tronox Q2 2015 Earnings Call)).
- 570. For example, in a 2015 earnings call, Masey, then CEO of Tronox, observed that

  Tronox is "managing [its] production so that/emtories get reduced to normal or below

  normal levels. And when that happens price rise... From what we see with Chemours

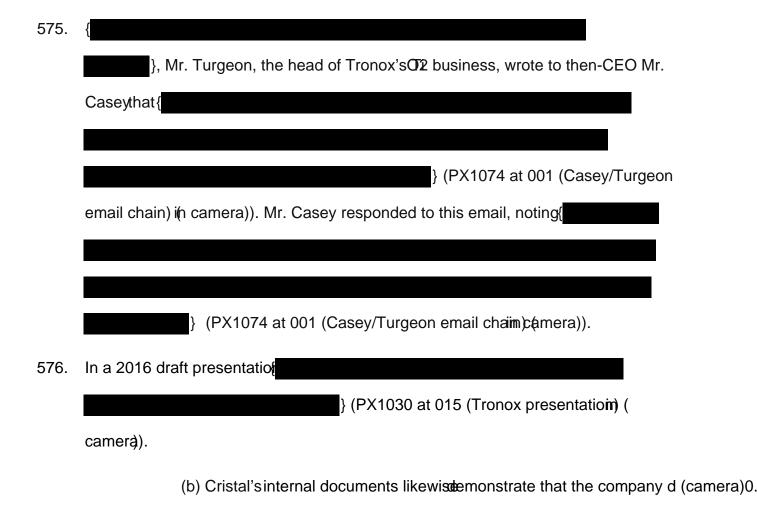
- and Huntsman and presumably the others as well, they're doing the same thing. We see them acting in the same way." (PX9005 at 010 (Tronox Q3 2015 Earnings Call)).
- When asked in a 2016 earnings call ablorothox's production decisions, including capacity cuts at its Hamilton plant, Mcasey emphasized Tronox's focus on managing supply to support increasingices, asserting that "a vedysciplined approach to production, to managing supply relative to demass out that has facilitized the recovery in our markets, and we intend to continue codisciplined about th." (PX9003 at 010-11 (Tronox Q1 2016 Earnings Call)).
- 572. Tronox's internal correspondence confirms the [PX1075 at 001 (Hinman/Casey email chain)damera; PX1074 at 001 (Casey/Turgeon email chaim)damera; PX1231 at 014 (Tronox presentation)in camera; PX1353 at 011 (Tronox presentation) camera).

  573. In 2012, John Romano wrote in an email tom Casey and Daniel Greenwell that {

  [PX1015 at 001 (Romano emailin camera).]

  574. {

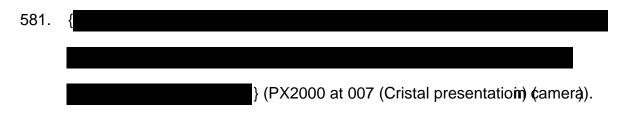
  [PX1075 at 001 (Hinman/Casey email chain)damera)].



(PX6005 at 020 (Lyondell presentatioin) ¢amerà).

- 579. In a 2009 market update document, Cristaledothat the TiO2 "industry continues to curtail" and indicates thathose decisions have "long teimplications." (PX2215 at 020 (Cristal Global Business Update)).
- 580. In 2011, Cristal executive Mark Stoll justified operating plants duced capacity stating that "this discipline of taking supply offline and allowing inventories to fall as demand improved lead to pricing discipline and pricing power over the following quarters."

  (PX2083 at 001 (Stoll/Najjar email chain)).



582. A 2016 Cristal strategy prestation indicated that (PX2116 at 005 (Cristal Presentation) ¢amera)).

That same document also noted that

) (PX2116 at 005

(Cristal Presentation)n(camerae)eeprchlod [(e)ridhat the." nort highwer-0.7ent)). 580. T

d

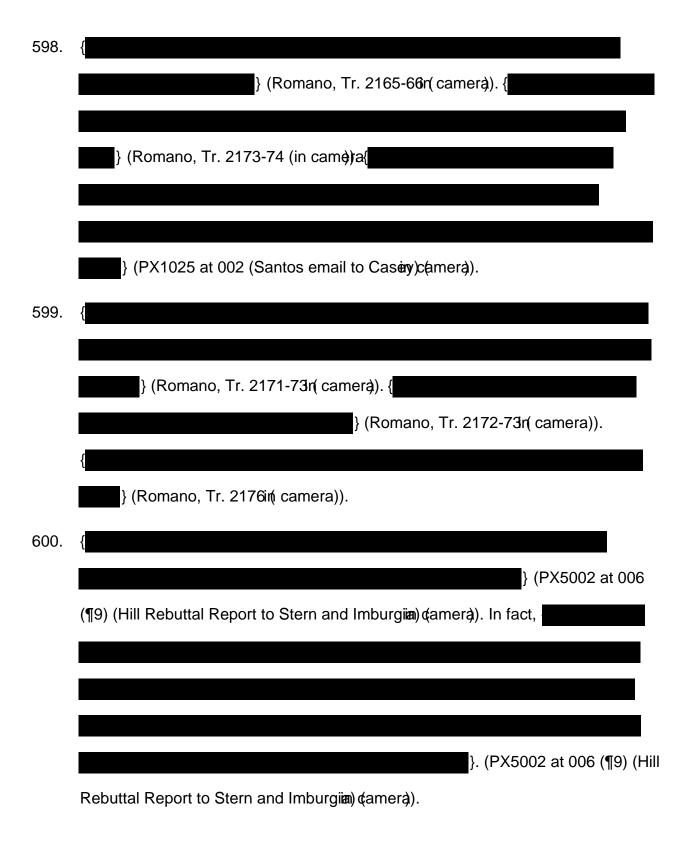
- Chemours likewise recognizes that reduted2 output leads to higher pricing.

  Chemourspossesses proprietary chloride titanium dioxide production technology that allows it to more easily 'arry [its] production in line with customer demand." (PX9025 at 003 (Chemours presentation)). It has told invessthat it will use thisability to operate "at lower levels of output when customereds . . . warrant that we adjust our production." (PX9025 at 003 (Chemours May 2011vestor presentation transcript)). The company also acknowledges that "historically, pricing increasesotileigh utilization." (PX9038 at 005 (May 2017 Chemours presentation)).
- 585. Consistent with that recognition, in conrientwith adding a new line at its Altamira facility in Mexico, Chemours announced it wdutial back productionat our other sites to offset the new Altamira volumes until our customer demand warrants additional production." (PX9055 at 004 (Chemours 2016 Earnings Call)). Those reductions included permanently closing its Edge Mondant in Delaware, and shutting down a production line at its New Johnsonville, TN, plant, removing of capacity. (PX2055 at 024 (Cristal presentation)). Tronox cheered these developments as "good news," with Trons then CEO Mr. Casey remarking, "[i]t's good [Chemours] can follow the leade(PX1130 at 003 (Romano/Bender e-mail chain); PX1325 at 001 (Casey email)).
  - iii. Respondents Have a History of WithholdiOutput to Support North American Chloride TiO2 Pricing
    - (a) Tronox has reduced North American chloride TiO2 output over the past decade in order to supplyorth American TiO2 prices

Tronox reduced its North American TiO2 output in 2012 in

order to support North Amerian chloride TiO2 prices Tronox lowered its North American chloride out 595. }. (PX5002 at 006 (Figure 1) (Hill RebultReport to Stern and Imburgial) ( camera). Tronox's August 2012 Board Update shows t 596. }. A slide titled{ ) (PX1109 at 011 (Tronox presentation) ( camera). The August 2012 Board Update further descrit 597. ). (PX1109 at 021 (Tronox presentation)in camera). As part of these efforts }. (PX1109 at 021 (Tronox presentation) camera). }. (PX1109 at 025 (Tronox presentationin(camera); PX1352 at 033 (Tronox presentation) ( camera).

(2)



Tronox reduced its North Amerin TiO2 output again in

2013 in order to support North American chloride TiO2 prices 601. Tronox reduced its North American chloride TiO2 out }. (PX5002 at 006 (Figure 1) (Hill Rebuttal Report to Stern and Imburgia) camera). 602. ) (PX1349 at 009, 028 (Tronox presentationin) (camera). { ) (PX1349 at 009 (Tronox presentatioin) camera)). Nevertheless( ) (PX1349 at 008 (Tronox presentation) ( camera). 603. (PX1399 at 002 (Tronox investor presentation)c/amera). { } (PX1399 at 002 (Tronox in secor presentation) r(

(3)

camera).

604.

	period, its average vizable margin during high-utilization
	times. Tronox's inventory was al during this period than its verage inventory
	when capacity utilization was (PX5002 at 006 (9)) (Hill Rebuttal Report to
	Stern and Imburgia)r( camera).
	(4) Tronox reduced its North American chloride TiO2 output in 2015 in order to support North American chloride TiO2 prices
605.	Tronox reduced its North American chloride out
	}. (PX5002 at 006 (Figure 1) (Hill Rebuttal
	Report to Stern and Imburgiain (camera); PX0003 at 012-17 (Tronox Second Request
	Narrative Response to Specification4(di)) (amera).
606.	In a 2015 earnings call, Tronox's then CEO Masey explained, "It is our view that an
	upward move in pigment selling prices will <b>pre</b> dicated on a reduction of supply in the
	pigment market relative to demand, and/oupward move in feedstock selling prices
	and we expect to see both." (PX90x07005 (Tronox Q1 2015 Earnings Call)).
607.	Following that call, Tronox idle its Hamilton chloride TiO2 plant. (Romano,
	Tr. 2165 (n camera); PX0003 at 015 (Tronox Second Request Narrative Response to
	Specification 4(d))i(h camera). Both
	} (PX7001
	(Romano, IHT at 167)in(camera); PX7026 (Duvekot, Dep. at 148-4i9) (amera).
608.	{

(Hill Rebuttal Report) i(h camera). In fact, Tronox's averageariable margin during that

}Van Niekerk, Dep. at 064)0( ( )Tj /TT1 1 15.64363 1 [(in came)w 3 (ra)]T.

	) (PX1435 at 001
	(Duvekot/Bianchi email chain)r( camera). Mr. Duvekot further stated the
	} (PX1435 at 001
	(Duvekot/Bianchi email chain)r( camera).
612.	After conducting an economic analysisnesiTronox's internal data, Dr. Hill also
	confirmed that
	}. (PX5002 at 006 (¶9 & Fig. 1)Hill Rebuttal Report to Stern
	and Imburgia) i(n camera).
	(b) Tronox remains committed to adjusting output to support North American chloride TiO2 prices
613.	Tronox remains committed to adjusting its output in order to support chloride TiO2
	pricing in North America(See CCFF ¶¶ 614-16, below
	}
	(PX1074 at 001 (Casey/Turgeon email chaiim)cámerá)

614. Tronox continues to abide by that strategyen today in times of high demand, by adjusting output to supptornigher prices in NorthAmerica. (PX9003 at 010 (Tronox Earnings Call Q1 2016); PX1333 at 010 (Tronox presentations). For

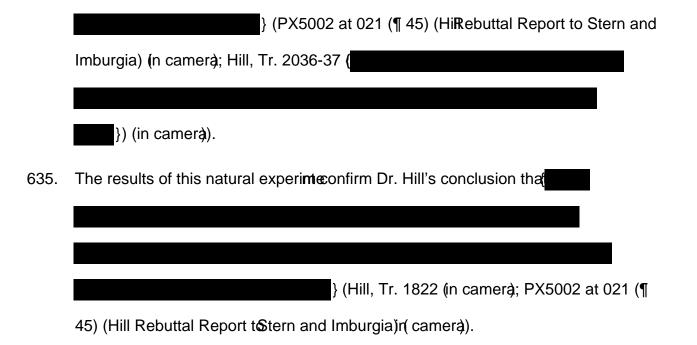
	financial crisis."); PX1109 all 11 (Tronox presentation) (camera) ({
	began when significant major capacityswaken off line in 2008 and 2009 during the
	next several years. (PX2083 at 001 (Stoll/Najjar emailn) h(ätihe pricing momentum
621.	Respondents credited both those reductions with leading to large price increases over the

622. Cristal considered reopening Hawkins Pointewhorices rose dramatically in 2011 and

625.	According to Dr. Hill's economic analysist Cristal's plant-level production data,
	Cristal's capacity utilization at its Ashtabula I plant v
	}. (PX5002 at 008 (Figure 2) (Hill
	Rebuttal Report to Stern and Imburgina) (camera). Conducting a similar analysis using
	the same data, Dr. Hill showed that Cristæbpacity utilization at its Ashtabula II plant
	was{
	}. (PX5002 at 008 (Figure 3) (Hill Rebuttal Report to Stern and Imburgia)
	(in camera)).
626.	Dr. Hill conducted an economic analysis using plant-level data, and four(
	}
	(PX5002 at 008 (Figs. 2-3) (Hill Rethal Report to Stern and Imburgian) (camera)
	PX0002 at 010-35; 105 (Cristal Second ReqRestponse to Specifications 4(d) and 26)
	(in camera)). Also, Dr. Hill found that during all but two of those time per
	} (PX5002 at 008 (Figs. 2-3) (HRebuttal Report to Stern and
	Imburgia) (n camera); PX0002 at 010-35; 105 (Cristalecond Request Response to
	Specifications 4(d) and 26) (in came)ra
627.	In 2016, a Cristal executive observed the
	} (PX2112 at 002 (Snider email)

	(in camera)). Those efforts included Cristal
	}. (PX0002 at 015 (Cristal Second Request Response to
	Specification 4(d))i(h camera).
628.	In 2016, Cristal observed th
	}
	(PX2116 at 005, 010 (Cristal presentation) (in car))era
629.	Cristal acknowledges the
	Response)in camera).
630.	These various output reductions providebaeis for the concerns expressed by many
	market participants that the merger of Tromand Cristal will lead output suppression
	4j ET Tw -he }

	) (Mill, 11. 1620-22
	(in camera)).
632.	In January 2017, Venator's TiO2 plant in Poriinland caught fire, forcing the closure of
	the plant. (PX3009 at 033 (Vetor lender presentation)n(camera); PX7015 (Maiter,
	Dep. at 115-16, 139, 164i)n(camera); PX7025 (Malichky, Dep. at 261i)n(camera).
	The plant has a nameplate capacity of alt metric tons of TiO2 annually.
	(PX3009 at 033 (Venator lender presentation)camera). The plant is not projected to
	return to full capacity until } at the earliest. (PX3009 at 033 (Venator
	lender presentation)n(camerà).
633.	Dr. Hill analyzed TiO2 producer invoice datad found that following the fire and loss
	of Pori's output,
	} (Hill, Tr. 1821-
	22 (in camera); PX5004 at 039 (¶¶ 89-90 & Fig. (IFI)II Rebuttal Report to Shehadeh)
	(in camera)). While Tronox and Cristabserage North American price
	}, respectively, their avege prices in Europ{ } from
	January 2017 to December 2017. (PX5004 at(\$\sqrt{9390} & Fig. 17) (Hill Rebuttal Report
	to Shehadeh)ir( camera); Hill, Tr. 1822 (n camera)). Prior to the fire at Venator's Pori,
	Finland plant, average European prices w
	} (PX5002 at 021 (¶ 44)
	(Hill Rebuttal Report to Stern and Imburgiar) ¢amera).
634.	To the extent that alternative source தம் ply, if any, replaced the Pori plant's lost
	output (presumably either imports through arbitrage), it did s
	} and caused prices in Euro



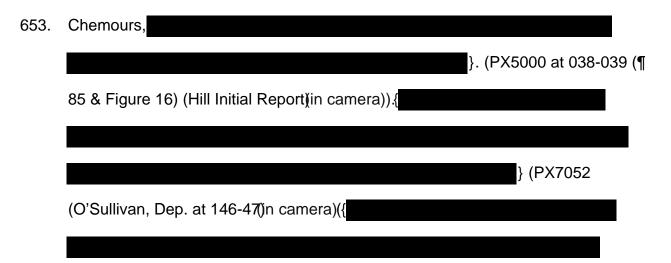
iv. North American Chloride TiO2 Producers Are Unlikely to Increase
Output in North America Sufficiently to Offset a Price Increase Resulting

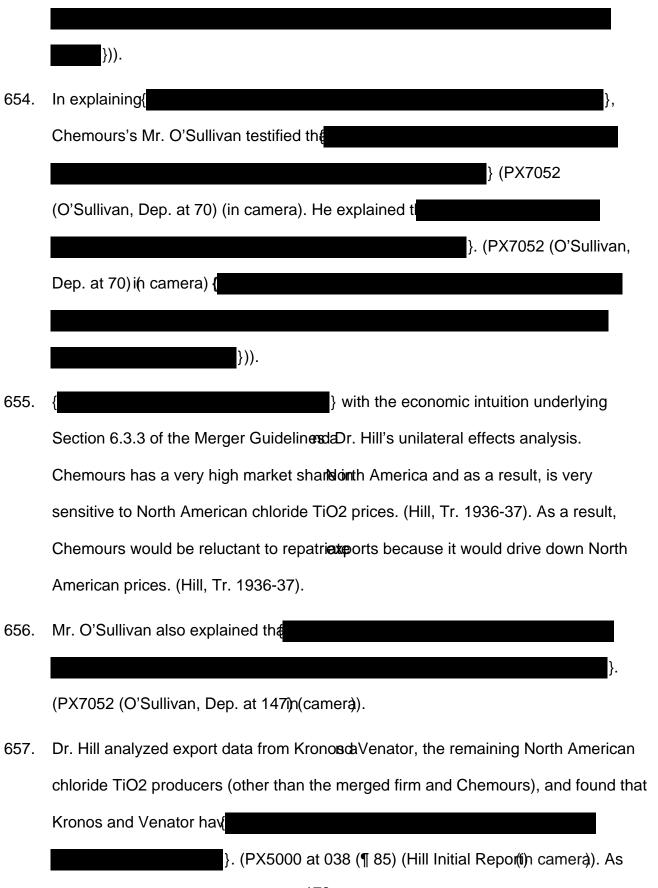
half of 2017, (PX7035 (Christian, Dep. at 75-76) (damera)), and TZMI reported its estimate of the North American utilization rate ( ) in 2016.(PX1663 (2017 TZMI Pigment Producers Cost Study spreadsh(eret) amera). Venator had in North America in 2016. (PX1663 (2017 TZMI Pigment Producers Cost Study spreadsh(eret) amera). Likewise, Chemours has told investors that "we are seeing cost demand globally and are lizting all our TiO2 plants at their full capability." (PX9059 at 004 (Ofmeurs Q1 2017 Earnings Call Transcript)).

- Moreover, after conducting a detailed econometrialysis of how North American TiO2 suppliers responded to past price increases in North America, Dr. Hill concluded that neither imports to North America nor repatriated exports (i.e. North American producer redirecting planned chloride TiO2 exports backworth America) are likely to discipline a price increasin North America resulting from top utput suppression. (Hill, Tr. 1929-30, 1932-33;ee CCFF ¶¶ 641-57, below).
- 641. Dr. Hill examined both imports and exposepatriation empirically relying on prior industry responses to price changes tordrete whether they right discipline a price increase resulting from the unilateral with whal of chloride titanium dioxide by the merged firm. (Hill, Tr. 1774-75).
- 642. Specifically, Dr. Hill estimated how responsive ports of chloride titanium dioxide are to changes in the price of chloride tiliam dioxide in North America based on how imports have responded to changes in pride orth America in the past. (Hill, Tr. 1774). This measure is known as the price elastic ftymports. (Hill, Tr. 1691-92). Dr. Hill's analysis shows that any increase in improved be small and insufficient to offset higher prices resulting from the mergerill (HTr. 1774-75; PX5000 at 11-12 (¶¶ 21) (Hill Initial Report) ('Imports of chloride titanium dioxidare unlikely to offset any price increase that results from the mergeril') (amerà).
- 643. Dr. Hill also examined whether North Aniestan chloride TiO2 producers would reduce their exporting behavior and inested sell some of that product in North America. (Hill, Tr. 1775). That analysis shows that North Aniestan chloride TiO2 producers have historically not changed their exporting behavior in responsivorth American prices. (Hill, Tr. 1775-76, 1929-30, 1932-33; PX5000 at 142-43 (¶¶ 319-20) (Hill Initial Report)

	}. (PX8005 at 004 (¶ 20) (Maiter Deo(lin) camera); PX0003 at 038 (Tronox
	Second Request Narrative Resse to Specification 16(
	}) (in camera).
647.	Because of those cost
	}. (PX7035
	(Christian, Dep. at 77-78)n(camera) PX8002 at 003 (¶ 14) (Christian De¢lir)
	camerà: PX8005 at 004 (¶ 19) (Maiter Declin camerà). Those specialty grades

- }. (PX8005 at 004 (¶ 21)Maiter Decl.)(in camera).
- 651. Chloride TiO2 imports from China are alsolikely to offset the price effects of a North American output reductionSee CCFF ¶¶ 745-812, below). Chinese chloride TiO2 production remains limited and demand for TiiO2 booming in China and nearby parts of Asia, resulting in tight supply, high price and reduced availability of Chinese TiO2 for export to North America. SeeCCFF ¶¶ 775-88, below).
- In addition to the evidence aggresting that increased imports by North American suppliers would be unlikely to discipline agar increase in North America, there is no evidence that North American producers the assponded to higher prices in North America by redirecting their exports back North America or that they would likely do so in the future. (SeeCFF ¶¶ 653-57, below). This quantitative evidence that export repatriation has not occurred in the pastoiss sistent with Dr. Hill's quantitative analysis showing that North American producers have not repatriated to sip the past. See CCFF ¶ 643, above).





- a result, even if Kronos or Venator were tpateriate their North American chloride TiO2 exports, it would have limited impact on North American prices.
  - v. Economic Modelling Shows that the Merged Firm Has an Even Greater Incentive to Withhold Outputhan the Stand-alone Firms
- have found it profit-maximizing in the patst withhold output to support North American TiO2 prices. (PX5004 at 041 (¶ 9(4)) ill Rebuttal to Shehadehin (camera); see CCFF ¶¶ 586-630, above). Economic intuition, incompated into Merger Guidelines § 6.3, suggests that a larger firm will capture mofethe benefit of withholding output (i.e., a price increase) than a smallferm because it accounts for a larger proportion of the market and have an greater incentive duce output. (Hill, Tr. 1764-69; PX5000 at 011, 069-75 (¶¶ 17, 159-77) (Hill Initial Reportin (camera)).
- 659. Dr. Hill conducted an independent empirical system to test whether this intuition would

- (a) The capacity closure model predicts that the merged firm has a stronger incentive to reduce outphan the stand-alone firms
- 660. The capacity closure model predicts **tthæt** transaction is likely to have an anticompetitive effect in the North Americæhloride TiO2 market by increasing the incentives of the merged firm relative to eacth the stand-alone firms to reduce output today. (Hill, Tr. 1858).
- 661. Dr. Hill developed the capacity closure model to assess a merger's impact on incentives to withhold output in markets involvinglæively homogenous pducts and high fixed costs. (Hill, Tr. 1771). Those conditions are met by the chloride TiO2 industry. (Hill, Tr. 1771).
- The capacity closure model has been employed by the Department of Justice's Antitrust Division in a number of merger matters, has baccepted by at least one federal court in Unites States v. Abitibi Consol., In 584 F. Supp. 2d 162 (D.D.C. 2008), and has been the subject of published articles. (Hill, Tr. 1770-71).
- 663. The capacity closure model focuses on whether a merger changes the merged firm's incentives to reduce output relative to sthend-alone firms. (Hill, Tr. 1772; PX5002 at 011 (¶16) (Hill Rebuttal Reports Stern and Imburgia()n camera).
- output. (PX5000 at 085-086 (¶ 19(0+)ill Initial Report) (in camera). If the benefits are greater than the costs, the merged firmikissly to have an incentive to reduce output. (PX5000 at 085-086 (¶ 190) i(Hinitial Report) (in camera)). To do that, the model assesses both the firm's costs of closing dapand whether the potential price increase

would be defeated by customers turning the products or somes of supply. (PX5000 at 086 (¶¶ 191-94) (Hilnitial Report) (in camera)).

In running the capacity closure models, Hill relied on the Respondents' own documents and data, including various interesslessments of the likely costs of idling production lines or closing paths, to assess the costsaofually doing so. (PX5000 at 086, 147-50 (¶¶ 191, 331-49)i(Hnitial Report) (in camera)). Those costs include manufacturing and variable costs for an idlingenario and both actual variable and fixed costs for a closure scenario. (PX5000 at 149 (¶¶ 344-46)li(Htial Report) (in camera)).

666.

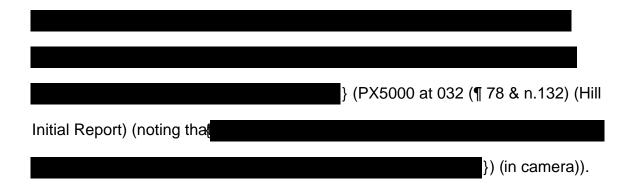
do not significantly increase and domestiroducers do not rede exports, into the capacity closure model. (Hill, Tr. 1772, 1774-75; PX5000 at 086, 148-50 (¶¶ 193-94, 338-40, 348-49) (Hill litial Report) (n camera); (PX5004 at 042 (¶¶ 98-99) (Hill Rebuttal Report to Shehadein) (camera).

- 668. The capacity closure model predicts that, executive market conditions, the merged firm would have { } (Hill, Tr. 1776, 1826-27in) { camera). It shows that } (Hill, Tr. 1826-27 in camera); PX5000 at 087 (¶199) (Hill Initial Reportin(camera)).
- The scale of the output reduction scenapinesdicted by the capacity closure model, including the most profitable scenario, is similarities taken by the Respondents combined during prior periods of outputitiestion. The capacity close model predicts that the most profitable outcorfor the merged firm would by (PX5000 at 088 (¶¶ 199-200 & Fig. 33) (Hill Initial Report) i(n camera). In 2015, for example, Tronox idled (Romano, Tr. 2165n( camera); PX0003 at 015 (Tronox Second Request Narrative Response to Specification 4(din) (damera); PX5002 at 008 (Fig. 2) (Hill Rebuttal Report to Stern and Imburgian) (damera).
- 670. To confirm that the merger increases the intives to withhold output, Dr. Hill checked whether the model predicts at the stand-alone firms have incentive to withhold output today. (Hill, Tr. 1777; PX5000 @88 (¶201) (Hill Initial Report) in camera)).

  The capacity closure model shows that absent the merger, neither stand-alone Tronox nor

affirming the robustness of the model's rless u(Hill, Tr. 1797; PX5004 at 042 (¶ 99 and Figure 19) (Hill Rebuttal to Shehadelin) ¢amera)).

675. Dr. Shehadeh also claims that Dr. Hill's export repatriation elastiscity low. (Hill, Tr. 1787). Dr. Shehadeh never calculates his ow



- (c) The Cournot model also predictsath merged firm has a stronger incentive to reduce output relative to the stand-alone firms
- 680. In addition to the capacity closure model, Bill also tested the impact of the merger using a Cournot model. (Hill, Tr. 1778, 1859)ke the capacity closure model, the Cournot model also examines whether the greechanges the incentives for the merged firm relative to the stand-alone firms to the hold output from the market. (Hill, Tr. 1778).
- 681. The Cournot model is "widely used byomomists who are analyzing concentrated commodity markets. This makes it a naturationize for analyzing the chloride TiO2 market." (PX5000 at 090 (\$105) (Hill Initial Report) (in camera); Hill, Tr. 1779; RX1072 at 0003 (Greenfield et al. paper) ("Tomeurnot model is a standard framework for analyzing issues of market powing rhomogenous goods industries"); RX1072 at 0003, n.4 (Greenfield et al. paper) ("Surveyseonnomic theories reliant to antitrust emphasize the importance of Cournot misother homogenous good industries.")).
- 682. The Cournot model has a few difference of the capacity closure model. (PX5000 at 090 (¶ 207) (Hill Initial Report) in camera). While Dr. Hill accounted for rivals' responses in his capacity closure moder gustata reflecting storical responses, Cournot allows rivals to really adjust their output in seponse to the actions of the merged firm. (Hill, Tr. 1778-79 ("in the Count model, rivals can have an unbridled")

- response. They can bring to bear any amotiotapacity they find profitable."); PX5000 at 090 (¶ 207) (Hill Initial Report) (camera). It also assumes that all firms behave strategically, accounting for thunderstanding among competitors that output decisions play an important role in chloride TiO2 pricing. (PX5000 at (P207) (Hill Initial Report) (n camera).
- Dr. Hill employed two models here because there are benefits to analyzing the effect of the merger using these different models. (Tr. 1778; PX5000 at 090 (¶ 206) (Hill Initial Report) (n camera)). It tests the accuracytoe prediction made by each individual model. (PX5000 at 090 (¶ 206) (Hillitial Report) (n camera)). If both models, despite their differences, predict similatects, "it shows that the prediction of an anticompetitive effect is robust and not unduly reliant on specific modeling assumptions." (PX5000 at 0902¶6) (Hill Initial Report) (n camera); Hill, Tr. 1778 ("To check how robust my findings were...")).
- Dr. Hill's Cournot model predicts that the merger would lead to higher chloride TiO2 pricing in North America relative to the blood world absent the merger unless the merger were to generate a more than 70 continuous in the merged firm's marginal cost as compared to those of the stand-alone firms. (Hill, Tr. 1781; PX5000 at 090-091 (¶209) (Hill Initial Report) in camera). Such a dramatic reduction the firm's marginal cost far exceeds any measure of the efficience or claimed by the merging parties let alone what analysis suggests is like hill, Tr. 1781; PX5000 at 090-091 (¶209) (Hill Initial Report) (n camera)). Consequently, the Cournot deb like the capacity closure model, predicts that the merger increases rithous to withhold output and will result in

higher prices for chloride TiO2 in NortAmerica. (Hill, Tr. 1781; PX5000 at 090-091 (¶209) (Hill Initial Report) in camera)).

- (d) Dr. Shehadeh's criticism of Dr. Hill's Cournot model is unavailing 685. Dr. Shehadeh's criticisms of Dr. Hill's Cournot model are unavailiage CCFF ¶¶ 686-94, below).
- 686. First, Dr. Shehadeh describes the Cournoden as being biasedwards concluding that mergers will be anticompetitive. (Sheden, Tr. 3390-91). Signifiantly, however, even the paper that Dr. Shehadeh affirmatively ends for its approach actually endorses the usage of the Cournot model for understagdhe competitive dynamics in commodity industries. Specifically, it ates, "The Cournot model is a standard framework for analyzing issues of marken were in homogenous goods industries." To substantiate this conclusion it includes the following footnot urveys on economic theories relevant to antitrust emphasize the importae of Cournot models following good industries.

  See, for example, Werden and Froeb (20208) Kaplow and Shapiro (2007)." (RX1072 at 0002 (Greenfield et al.) Not only is Cournot a standard playing model, but the relevant question is not the patiction of harm itself, but it

be behaving similarly. Thus, any inhibitions the magnitude of rivals' supply responses reflect their recognition of the ligopolistic nature of the market and the impact on price of additional supply. Dr. Hill explains these issues, citing to canonical textbooks on industrial organization, in his initial report. (PX5000 at 88-892(17)-09) (Hill Initial Report) (n camera).

688. Fruthermore, Dr. Hill shows that the qualitatione

- similar, affirming the accuracy of himsodel. (PX5004 at 46 (¶112 & Fig. 21) (Hill Rebuttal Report to Shehadehn) ¢amera).
- In another unavailing effort to undermine Dr. Hill's Cournot model, Dr. Shehadeh, without justification, applied alternative modeling framewik to Dr. Hill's Cournot model and claims that doing so reduces the predicted price increase from the merger. (Shehadeh, Tr. 3403-06). First, Dr. Shehadeeliance on the Greenelid et al. approach is unwarranted here. While Greenfield waterapting to address a quirk in the California refinery market where the standard Courmodel predicted marginal costs that were below the cost of one of the inputs to their fined product, an implausible result, no such issues arise hebrecause the margins predicted bout on are similar to observed data undermining the use of the Greenfield batapproach. (PX500alt 048 (¶¶ 117-19) (Hill Rebuttal Report to Shehadeh) (amera). Moreover, as Dr. Hill shows in his rebuttal report, altering the Cournot model so that it more closely resembles that used by Greenfield et al. has trivial impact on the picted price increasing wering it from 8.4% to 8%. (PX5004 at 047-51 (Section 5.B.2) (Hill Rebuttal Report to Shehaideh) (camera).
- Greenfield et al. model—does not haverage desimpact on the predicted harm from the merger. (PX5004 at 047-51 (Section 5.B(12))|| Rebuttal Report to Shehade hin) (camera). Instead, the driving force behind. Deshehadeh's smaller predicted price increase is the margin earned on Tronox's fistage that he imposes, which ultimately determines what all market participants earning on their ownfal sales. (PX5004 at 047-51 (Section 5.B.2) (Hill Rebtal Report to Shehadehin (camera)).

- Dr. Shehadeh's imposition of a margin of 116% Tronox's final sale is neither justified by the Greenfield et al. paper is it well-founded in the evidence assembled in the record. See RX0170 at 186 (¶ 315) (Shehala Expert Report)). As Dr. Hill explains, the usage of the difference between the Northe Airran price and the world price is not consistent with reasonable econometric exattroins of market pracipant behavior.

  Moreover, it is out of step with evident beat Dr. Shehadeh himself assembled on the variation in capacity utilization of different plants. (R 5004 at 44-45 (¶¶ 122-25) (Hill Rebuttal Report to Shehadeh) (amer).
- 694. Dr. Shehadeh also argues that the Cournouterhis unreliable because it predicts that the

- In addition to the potential founilateral output reduction, this erger will also eliminate beneficial head-to-head competition between the merging paties. QCFF ¶¶ 696-703, below). The Horizontal Merge Guidelines warn that mergers can harm a market when "a merger between two competing sellers preservency from playing those sellers off against each other in negotiations. This eloan significantly enhance the ability and incentive of the merged entity to obtain a tensore favorable to it, and less favorable to the buyer, than the merging firms would have separately absent the merger."

  (PX9085 at 025 (Horizontal Merger Guidelines, § 6.2).
- 697. Similarly, in an effort to obtain more favorletpricing from its current supplier, Tronox,

  Deceuninck North America, applics manufacturer, hasardned out to Cristal as a

  potential source of supply that wouldmpete with Tronox. (Arrowood, Tr. 1069-71).
- 698. PPG, a manufacturer of aitterctural and industrial cotags, currently purchase }. (Malichky, Tr. 293-94 (n camera); PX8000 at 002 (¶ 8) (Malichky Decln) (amera). {

  (Malichky, Tr. 324-25; 609-10 i/n camera)). Specifically.

- }. (PX8000 at 002 (¶ 8) (Malichky Decli)n(camera)).
- Those benefits may be coming to an entablit merger is consummated. During PPG's recent negotiations with Tronox, John Roma, aTronox's Chief Commercial Officer, informed PPG that Tronox intends to raise PPGG'se for chloride TiO2 if the merger is completed. (Malichky, Tr. 280-81; 561). Specially, Mr. Romano told PPG that Tronox plans to raise the premerger price PPGeives from Cristal cause Cristal lacks "market discipline" and "give[s|TiO2] away" at prices that are too low. (Malichky, Tr. 280-81). Tronox told PPG that [Malichky, Tr. 285-86 i(h camera)]. Tronox also

} (Malichky, Tr. 285-86i(h camera). Tronox also told PPG that

} (Malichky, Tr. 284-85i\(\hat{n}\) camer\(\frac{1}{2}\); Malichky, Tr. 563).

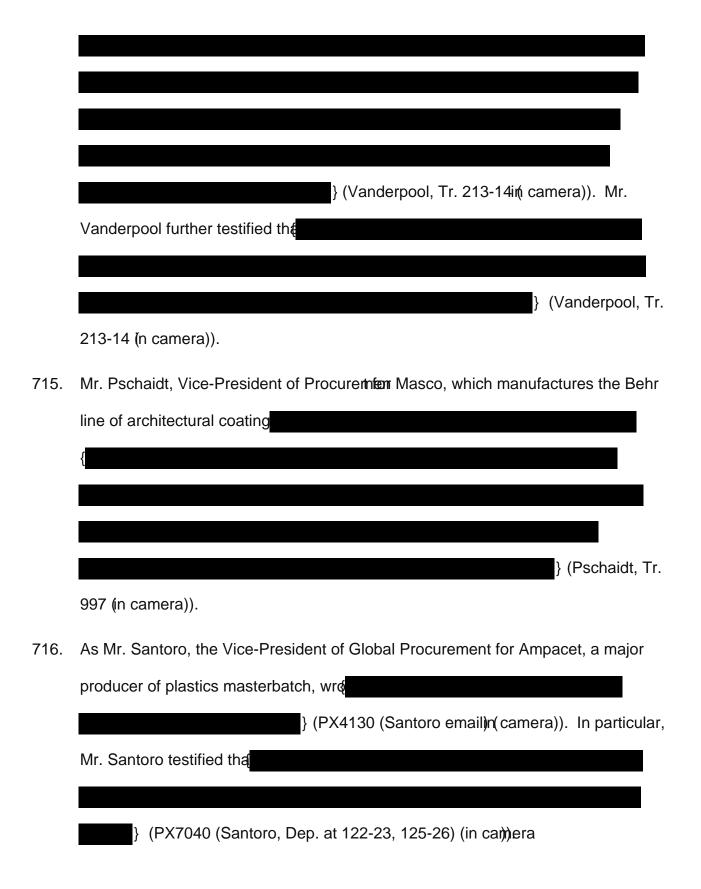
700. In the U.S. and Canada,

I 24.1f 0.0003 Ta8.3 (<( Td [(34cen)5.5 ET /Fi284-85 ()Tj /TT3 f -0.000

	}) (in camera).
702.	Masco, the manufacturer of Behr pai
	}. (Pschaidt, Tr. 996-97 (in camera)).
703.	In addition to price effects, Tronox's acquisitiof Cristal could also harm customers in
	other ways{
	} (Malichky, Tr.
	329-30 (n camera)).
	D. <u>Industry Participants Believe ConsolidatiWill Lead to Higher Chloride TiO</u> 2 <u>Prices in North America</u>
704.	The evidence is clear that Tronox and Cristal well as customers and TiO2 competitors
	projected that the Acquisition would resimtreduced competition and higher prices.
	(See CCFF $\P\P$ 705-24, below). This evidence supplies overall conclusion that the
	Acquisition would violate Setion 7. (PX9085 at 007-09 (Horiztal Merger Guidelines,
	§ 2.2); Hill, Tr. 1841-42; PX5000 at 106-09 [248-250) (Hill Initial Report) (n
	camera).
705.	Cristal and Tronox both recogniz
	For example, in a December 2015 Marketing and Sales presentation,
	Cristal stated that

planning on raising the Cristarice at PPG. After the -- and let me -- after the transaction is complete, obviously, but after transaction, they were going to raise the Cristal price." (Malichky, Tr. 280-81).

709. According to PPG's Mr. Malichky, Mr. Romandrabuted Cristal's low pricing to a lack of "market discipline": "Q. And did Mr. Romano explain why? A. We had a long conversation about that that day, and we are other conversations with him. And it relates to market discipline. Q. What you mean by "market discipline"? A. Market discipline, as the way it was plained to me during that meeting and other meetings, is to



- 717. Steve DeCastro, the Vice-Presint of Purchasing for RPM, a producer of the Rust-Oleum paints, testified that he had concerns about the merger because "when you have less producers, it's not good for buyer PX7016 (DeCastropep. at 127)).
- 718. As Mr. Post of Akzo Nobel, a multi-natio de atindes posinufacturer, testified at his Dieum closed ducia Puandwhen it did nu7zotcaial i (u)3

A30Monte.uahiifae0.8 (1r bec buir)-6ger

- 721. Further, Tronox's TiO2 competitors have the acclear in public disclosures to their investors after the acquisition and that that increds TiO2 consolidation from the proposed acquisition would lead to dured level of comptition and therefore increased pricing. See CCFF ¶¶ 722-24, below).
- 722. Kronos, in a September 2017 Public Investors that "[h]igher concentration increases likelihoofdcontinued capacityonstraints." It described the higher concentoration therefore, to be a part the industry "[s]tructural improvements" that would lead to direct earnings. (PX3011 at 38 (Kronos presentation); Christian, Tr. 772 ("Higher concentrations along in the industry" and "capacity constraints" means at the capacity constraints already existed at the time in the industry, and these potentiand in some cases these consolidations that we were seeing -- we think further increase the likelihood the those constraints would be present for an inger period of time.")).
- 723. Venator, in a June 2017 investor presentative pared in conntion with the Initial Public Offering for the TiO2 business, ojected that the acquisition would provide the TiO2 business, ojected that the acquisition would provide the TiO2 business, ojected that the acquisition would provide the TiO2 business, ojected that the acquisition would provide the TiO2 business, ojected that the acquisition would provide the TiO2 business, ojected that the acquisition would provide the TiO2 business, ojected that the acquisition would provide the TiO2 business, ojected that the acquisition would provide the TiO2 business, ojected that the acquisition would provide the TiO2 business, ojected that the acquisition would provide the TiO2 business, ojected that the acquisition would provide the TiO2 business, ojected that the acquisition would provide the TiO2 business, ojected that the acquisition would provide the TiO2 business, ojected that the acquisition would provide the TiO2 business, ojected that the acquisition would provide the TiO2 business, ojected that the acquisition would be acquisition would be acquisition would be acquisition would be acquisition to the TiO2 business, ojected that the acquisition would be acquisition would be

724. About a month later, a Venator July 2047alyst Day presentation by Venator's Chairman, Peter Huntsman, and President, Simon To

VI. ENTRY AND EXPANSIO
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728.	Entry or expansion into the market for that of chloride TiO2 to North American
	customers will not be timely, likely, or sufficient offset the anticompetitive effects of
	the merger. SeePX9085at 028-29 (Horizontal Merger @delines, §§ 9.1-9.3)). First,
	entry or expansion into the mature North Am

730.	According to a 2017 TZMI report
	} (PX1663 at 030 (TZMI,
	presentation)in camera; PX3038 at 050{
	) ({
	}) (in camera). Tronox similarly{
	}
	(PX0017 at 033 (Tronox Response to FTQ Rest for Additional Information) in
	camera).
731.	The reasons for the absenceofry are clear: there are significant and costly hurdles to
	entering the chloride TiO2 marke
	} (PX3038 at 022{
	}) (in camerà).
732.	Tronox and Cristal agree wi
	new chloride titanium dioxide plant are verigh. (PX9119 at 003 (Tronox investor call
	transcript) ("the capital costor a new chloride plant arcery high and therefore, the

capital risk associated with decision is inextignificant.")). Recently, Tronox estimated		
the cost of constructing such a new plant in the United States as rangin		
} (PX0017 at 033-34 (Tronox Response to FTC Request for		
Additional Information) (n camera); PX5000 at 108-09 (¶ 25(8))ill Initial Report) (in		
camera). Cristal similarly estimated that building a new plant in the United States		
would cost } (PX0002 at 067 (Cristal		
Second Request Response)a(amera).		

733. Entry into the North American TiO2 ma

	period." It concluded that price and margin improvemment about \$1,000 per metric
	ton would be "required to justify reinvestment" and shared that there were no announced
	plant expansion projects in Ntb America (PX3011 at 015, 027) (Kronos Public Investor
	Presentation); PX3038 at 02(
	({
	}) (in camerà).
736.	The potential impact on prices of adding aidedial chloride TiO2 capacity to the North
	American market further reduces the likelod of entry or expansion, especially by the
	major North American TiO2 producers whowld most benefit from the higher TiO2
	resulting from the merger. (PX7036 (Keegel, Dep. at 1
	) (in camera; PX1091 at 084 (Tronox prestation) (with respect to
	greenfield entry{
	} (in camera).
737.	Capacity expansion at an existing chlor™e2 plant, which could increase a plant's
	output by adding a new line, is also costly. (Christian, Tr. 764). Kronos estimates that
	such an effort could cost upwards\$200 million. (PX3007 at 014 (Kronos
	presentation)). Cristal estimates it would q
	(Cristal Response to FTC Request for Additional Information).

- 738. Although TiO2 producers have actively engalopser the years in debottlenecking to increase their production of TiO2, thence limits to debottlenecking, including the physical size of the plant, technology, and permitting. (Christian, Tr. 76sle62also Hill, Tr. 1864-65 (Incremental increases like debottlenecking is usually absorbed by increases in demand.)). More importanthyost of the potential debottlenecking has already occurred over the lasti-20 years, so it is unlike to have an effect on the market. (Christian, Tr. 761-62 ("a lot ofettelebottlenecking has already taken place over the last 15, 20 years")).
- 739. In addition to high costs, constructing a newlood TiO2 plant is lengthy process that typically requires at leasour to five years, rendering such efforts untimely. For example, Tronox estimates that entry ithe manufacture of chloride TiO2 would

PX0003 at 034 (Tronox Response to FTC Request for Additional Information) in camera; PX1636 at 001 (Romano email to Arndt) ("Four years for a greenfield plant would be aggressive. . . Totarne line would be 54 months or 4.5 years if everything went according (aggressive)."); Romano, Tr. 2138-39 (agreeing that "aggressive" means "faster than you would expect")).

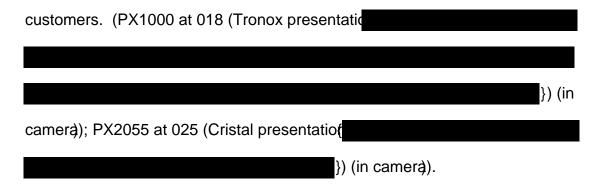
- 740. Other TiO2 producers have similar views negligag the lengthy time required to build a new chloride TiO2 plant. PX0002 at 067ri@al Narrative Response, Response to Specification 13)
  - }) (in camera); PX3007 at 014 (Kronos

    Presentation); Christian, Tr. 765 ("[Y]ouowld have to get permitting both from a

    manufacturing standpoint and an environmlestandpoint, and then you have to invest a

significant amount of capital tactually build a	TiO2 plant. You know, they're not
available for sale, you know, off the shelf. It's	a completely engineered and a slow
process that's individual to each produc <b>ee's</b> hr	nology. They take a long time to build.");
PX3037 at 003{	}) (in camerà; Hill, Tr. 1869-
70; PX5000 at 107 (¶ 25 <b>(</b> ∰ill Initial Report) (r	n camerà; PX3035 at 025 (Venator
presentation){	}) (in camera)).

741. Even after expending the coefficient time required to design, build, and bring a new chloride TiO2 plant on-line, many customersul/abthen need to qualify the TiO2 grades produced by the new plan(See CCFF ¶¶ 748-54, below) his process can be quite lengthy, and the qualification proce { (PX8000 at 003 (¶ 13) MalichEite3; Pl. (



743. As Tronox's then-CEO, Mr. Casey, explainedai@1012 earnings call, "We think that the intellectual property, particularly with respt to the know-howbout how to operate

business. [Kronos] do[es] everything we can to protect	it." (Christian, Tr. 789; PX3011
at 013, 019, 027 (Kronos presentation) ("High læars ito er	ntry for chloride process TiO2
capacity Chloride process technologyolosely held b	by the major producers.");
(PX3038 at 022{(	}) (in camera

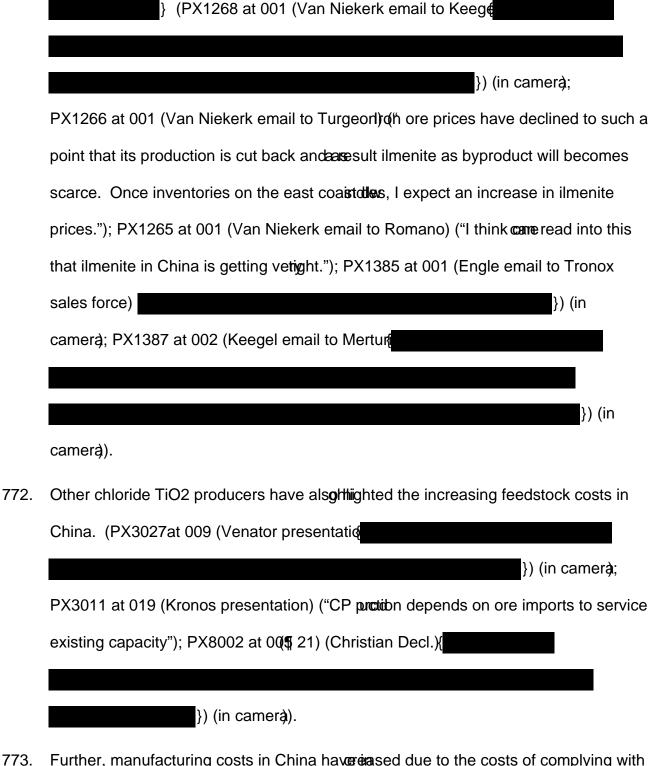
- 748. Customers in North America have strict qualequirements for their TiO2 and strict requirements for their suppliers, includistrong reliability standardsSeeCCFF Section III.A.i., ¶¶ 26-133, above).
- 749. Chinese chloride TiO2 lacks the requisite quality that customers in North America require. Chloride TiO2 fron Chinese producers, including }, has not passed the qualification requirements set by said North American customers, to even be considered as a potential source of supply.

	}) (in camera); Pschaidt, Tr. 986-8in (
	camera; PX7027 (Pschaidt, Dep. at 137-38) ¢amera; PX8006 at 003 (¶ 16) (Pschaidt
	Decl.) ({
	}) (in
	camera; PX8001 at 003 (¶ 14) (Zamec Declr) ¢amera).
754.	{
	} (PX8000 at 004 (¶ 17)Malichky Decl.) (n camera); Pschaidt, Tr.
	986-87 (n camera); PX7027 (Pschaidt, Dep. at 62-62
	)) (in camera)).
	(b) No Chinese producer is currentlypplying chloride TiO2 to North American customers in significant volume in part because of technology issues and lack of know-how
755.	р

	}) (in camera). In November 2016, Tronox observed t
	} (PX1006 at 015 (Tronox
	presentation)in camera).
757.	Chinese TiO2 producers have struggle produce chloride TiO2. Tronox has identified
	several reasons accounting fbose struggles, including
	} (PX1000 at 018
	(2016 Tronox Strategy Documenith) (camera); PX1012 at 005 (Tronox presentationn) (
	camera ({
	}); PX1062 at 009-11 (Tronox presentation);
	PX1067 at 001 (Engle email to Larson) ("The ve no idea what they are doing.");
	PX1387 at 002 (Keegel email to Mertur
	}) (in camera); PX1399 (Tronox "Fireside Chat" Q&A
	}) (in camera)).

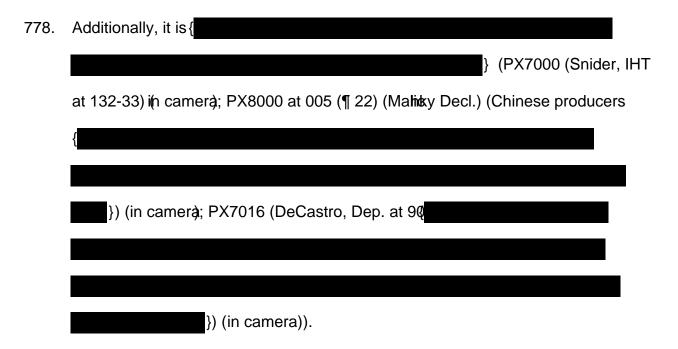
Lomon Billions' announced expansion:	
}) (in camerà; PX7035 (Christian, Dep. at 22(﴿)	
}) (in camerà; PX8002 at 005 (¶ 22) (Christian Decl₄) (	
}) (in camerà).	})(

}



773. Further, manufacturing costs in China havereisased due to the costs of complying with environmental and other government retions. (PX5002 at 020 (411) (Hill Rebuttal Report to Stern and Imburgiain (camera)). Tronox has emphased these continuing

	cost pressures publicly in recent lender involvestor presentations. For example, Tronox
	in September 2017, stated to a lenthat there were the sever
	}
	(PX1437 at 019 (Tronox presentation) ¢amera); PX1438 at 019 (Tronox presentation)
	(in camera); Christian, Tr. 798-99 ("But then the camera"); Christian, Tr. 798-99 ("But then the camera");
	improved pieces of equipment, whether it's desulfurization unit or some sort of
	environmental equipment that just adds tothe product, but does not actually change
	the quality of the product, so their cost structure increaseurigeon, Tr. 2727).
774.	In 2017, Venator made similar points to its estors, addressing the range of factors
	contributing to increasing cossassociated with TiO2 manageture in China. (PX3027 at
	003 (Venator presentation
	}) (in camera).
	(d) Local Chinese demand for chlorideO2 is increasing and there are limits on availability of chloride TiO2 from China
775.	Domestic demand for Chinese chloride Tii 2 growing faster than supply, making it
	unlikely that there will be an increase in Chinese imports into North AmeSeaCCFF
	¶¶ 776-80, below; Hill, Tr. 1879).
776.	{
	} (PX0011 at 036 (Tronox
	board of directors and committee meetings)camera). In November 2016, Tronox



Overall, Chinese TiO2 capacity has declined the last several years due to increasing environmental regulation and enforceme (PtX2072 at 023 (Cristal resentation) (10-15 plants idled, many expected to close, articles expected to close due to environmental issues); PX9001 at 006 (Tronox Q3 2016 Eagrai Call) (observing that net Chinese production was down in 2015 and would be

camera) (Moung, Tw. Td () Tj 0 Tc 0 2972467.04862.346856

}) (in camera).

780. Tronox described the reduced production in @himits third quarter 2016 earnings call: 
"In the longer term, we look at the various ditions and subtractions of production in China....[N]et of both additions and withdrawals or closures,

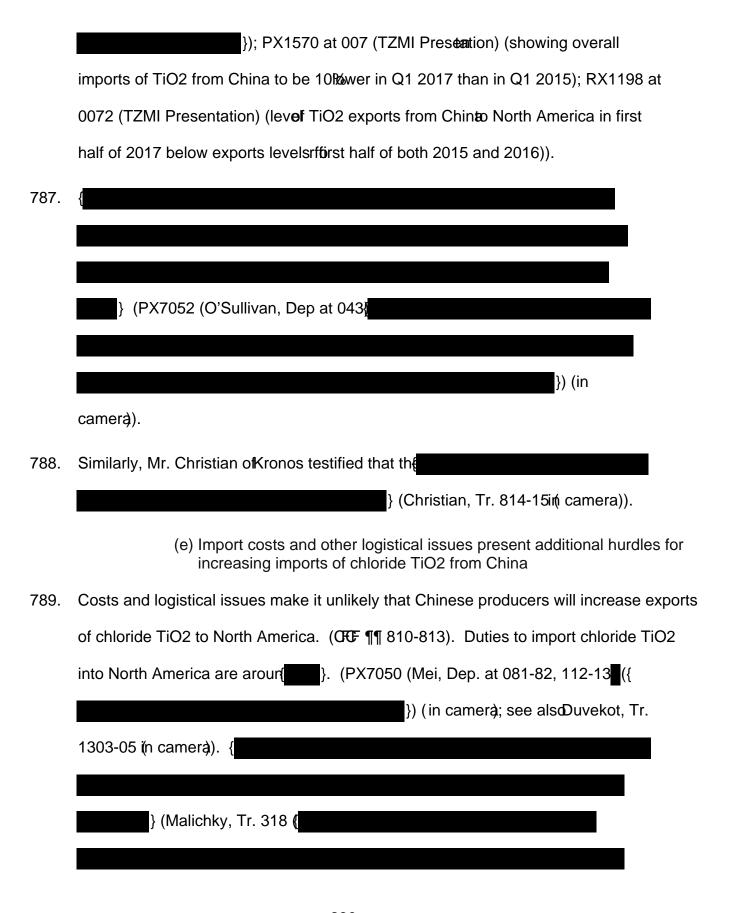
capacity as government drives environmental improvements." (PX3011 at 038 (Kronos presentation)). This was among the factals in with the capacity reductions and industry structural improvements, that Krondesscribed to its investors would drive increased EBITDA for Kronos. (PX301at 038 (Kronos presentation)).

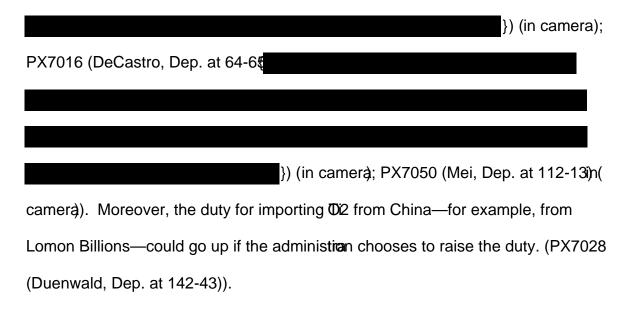
- Further, as the overall availability of TiO2shaliminished, the price of TiO2 in China has increased quite dramatically in recent yealm a May 2017 invator call, Tom Casey estimated that through Q1 of 2017, pritassChinese TiO2 increased by 65% for domestic sales and 45% for export salesestine start of 2016 alongue to the reduced capacity for pigment, as well as reduced a traility and higher cost of feedstocks in China. (PX9028 at 004 (Tronox Q1 2017 Earnings Call); see also PX1061 at 005 (Tronox presentation) (showing increasing Chinesseret prices since the beginning of 2016); PX1395 at 008 (Tronox investor draft Q&As)Qhinese pigment producers continue to raise domestic and export selling prices. Cithe start of [2016], wheave seen 11 price increase announcements made by ChineSe2 Tiroducers, essentially one per month. Chinese domestic selling prices offeredaodelivered basis are up 15-20% YTD. In export markets, selling prices offered of the basis are also up 15-20% YTD.")).
- 785. Those Chinese prices have continued to increase in 2017. (PX9099 at 007 (Tronox Q3 2017 earnings call) ("[W]e feel very comfortebbday that the Chinese price have [sic] moved in the same range as our price?")(7001 (Romano, IHT at 229) (discussing

}) (in

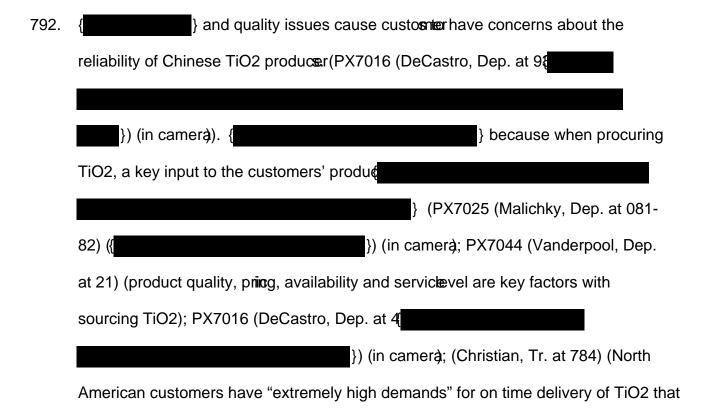
camera; PX1619 at 016, 019 (Tronox TiO2 Varizen Analysis) (indicating that TiO2

	) (in
	camera; PX8003 at 005 (¶ 24) (Young DeçlAX7025 (Malichky, Dep. at 230)
	}) (in camera).
786.	With reduced availability and higher TiO2 prices in Asia, overall TiO2 imports into
	North America from China have decline or example, Tronox's Monthly China Trade
	Report from October 2017 showed through October 2016 through September 2017,
	China's TiO2 exports to the U.S. decreabyd 9% from their already small amount.
	(PX1538 at 004 (Tronox presentation); 70121 (McGuire, Dep. at 101) (discussing
	PX1538:{
	}) (in camera); seePX1395 at 008 (Arndt email)
	({
	}) (in camera);
	PX3027 at 014 (Venator presentati) (Chinese "Net exportat" based on information
	through May 2017); PX3054 at 091 (Water presentation)





790. A producer from China would also face the confishmaintaining storage to meet the needs of customers who require regular on-tinhedivery. (PX7054 (O'Malley Noe, Dep. at 111-12) ("What we do is if we



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(Respondents' Pre-Trial Brief, at 43) ("Incath, Chinese TiO2 producers, particularly Lomon Billions, pose a credible, growing threatTiO2 producers in North America").

Specifically, Respondents point to Lomon Billion's announcement of plants to expand chloride TiO2 production capacity at itsapt in Jiaozuo, H

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- 796. Consistent with the testimony of Mr. Quinnch Mr. Turgeon, and based on his review of documents and industry reports such as Ita MI report, Dr. Hill concluded that the announced Lomon Billions expansion would not affect his opinions regarding the impact of Chinese expansion, due to the fact that expansion, even we with occur, "will likely be absorbed by growth in demandine Asia-Pacific region." (Hill, Tr. 1881).
- 797. The new Lomon Billions plant is unlikety have an impact on North American customers for the following reasons: (1) Lomon Billions has virtually no
  - } (2) Lomon Billions has
    - ) Loom Billion had notbeeny

camera); PX1062 at 079 (Tronox presentation) (Lomon Billion); (In camera); PX1062 at 077 (Tronox presentation) (In camera); PX1671 (Casey email) ("They have expressed interest in "cotopoe" with us, but probably not until their combination is closed.")).

806. Moreover, even though Lomon Billions has strægte make its current chloride TiO2 plant fully operational, Lomon Billions' estimate the amount of time it will likely take to build its new plant is much faster that much more experienced operators, such as Chemours. (Romano, Tr. 2140; PX1636 at 001 (Arndt email)). The announced

- ii. Imported Chinese Sulfate TiO2 Would Not Offset Likely Anticompetitive Effects in the Relevant Market for Sale of Rutile TiO2 to North American Customers
- 808. The vast majority of TiO2 manufactured@hina is sulfate TiO2. (Malichky, Tr. 320 ("The chloride material out of China is ve

}) (in camera); PX1033

at 002 (Tan email to Engle) (actual chloritie) production in China estimated at "0.1 mio mt per year" as compared to national capacity of 0.24 mio mt")).

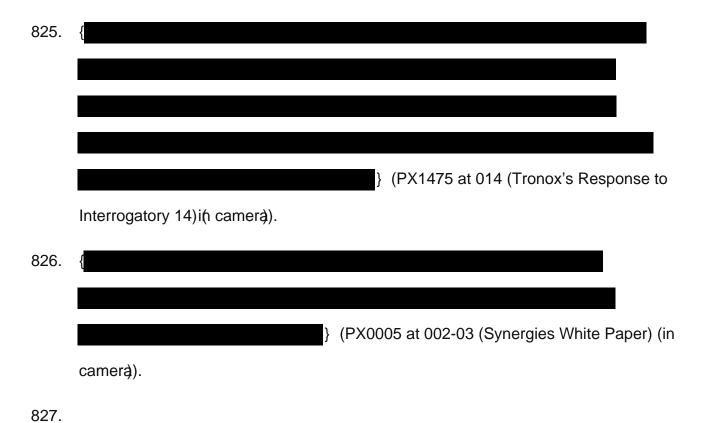
	} (Mei, Tr.
	3179 (n camera).
818.	{ PX7000
	(Snider, IHT at 78-80{
	}) (in camerà). {
	} (PX7000 (Snider, IHT at 67)n(camera); PX7004 (Gunther, IHT at
	60) ({ }) (in camera).
819.	{ (PX7035 (Christian, Dep. at 77)
	(discussing
	}) (in
	camera; PX7035 (Christian, Dep. at 77-78
	}) (in camera).
820.	Venator, from its chloride TiO2 plant in the U.
	} annually. (PX8005 at 004 (¶19)
	(Maiter, Decl.) (partiallyin camera): PX3025 at 011 (Veroatoresentation)in camera).

**PUBLIC** 

- 821. Further, the customer-specific qualification **perss**, which can take years, precludes most firms from being rapid entrantsSeeCCFF ¶¶ 93-110; 382-89, above).
- 822. Dr. Hill therefore assessed market shares based on chloride TiO2 sales to targeted customers in North America, and unlike **Sh**ehadeh, did not include speculative sales that were unlikely to affect the marke **Se**(e CCFF ¶¶ 745-812, above).

## VII. EFFICIENCIES

- A. Respondents Failed to Substantiate Coghez Efficiencies Under the Guidelines
  - i. Dr. Zmijewski Is the Only Expert to Opine About the Claimed Efficiencies and the Only Expert to Opine About the Claimed Efficiencies in a Guidelines Framework
- 823. On August 15, 2017, Tronox submitted advocacy to the FTC titled "White Paper on Synergies on Behalf of Tronox" (herein "Synecustor0o1thi

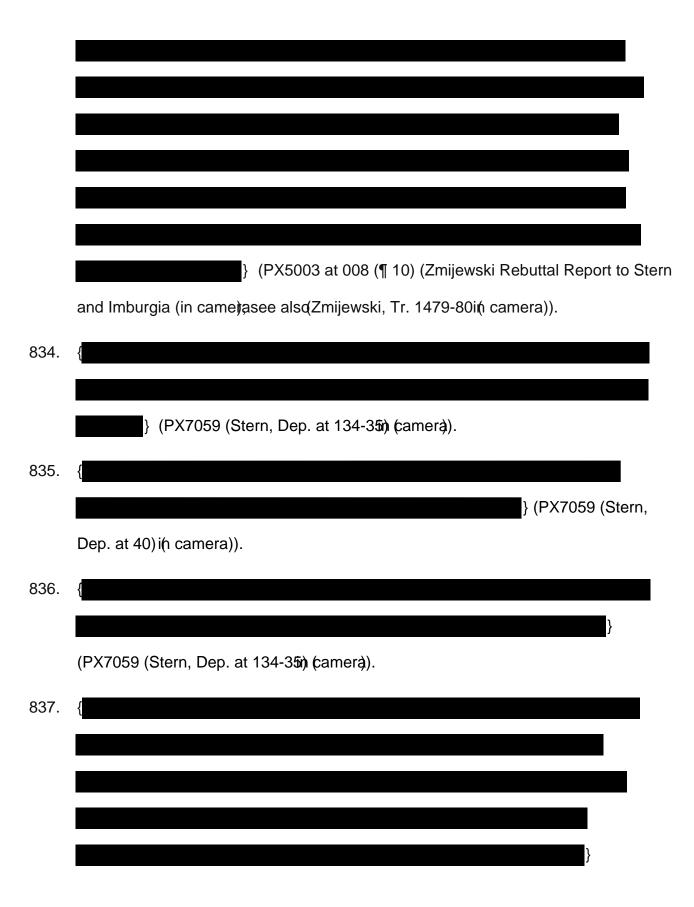




- at 01 (Zmijewski Initial Report)in (camera). In addition, he submitted two rebuttal reports, the first dated April 30, 2018, rebruttihe reports of Respondents' experts Mr. Kenneth Stern and Mr. Basil Imburgia (hereZmijewski RebuttaReport to Stern and Imburgia"); the second dated May 10, 2018, rebrutthe report of Respondents' expert Dr. Ramsay Shehadeh (herein "Zmijewski Rebuttal Report to Dr. Shehadeh"). (PX5003 at 01 (Zmijewski Rebuttal Report to Dr. Shehadein) (camera); PX5005 at 01 (Zmijewski Rebuttal Report to Dr. Shehadein) (camera).
- 830. Dr. Zmijewski evaluated Respondents' claimeticiencies according the analytical framework set forth in the Horizontal Merger Guidelines and the Commentary on the Horizontal Merger Guidelines. (Zmijewski, .Tr430). His initial report clearly sets forth the applicable standards under the Horizologer Guidelines and his methodology for evaluating the verifiability and merger specificity of claimed efficiencies, which is consistent with those standards. (PX5001 at 012-17 (¶¶ 16-24) (Zmijewski Initial Report) (n camera); see alsoZmijewski, Tr. 1431-33).



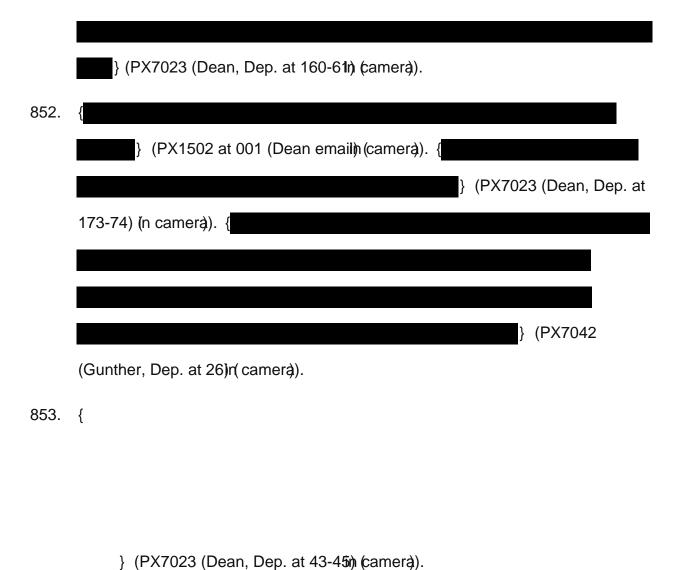
} (PX5001 at 011-12 (¶ 15) (Zmijewski
Initial Report) (n camera)). His two rebuttal reports frience this opinion. (PX5003 at
007-08 (¶ 8) (Zmijewski Rebuttal Report to Stern and Imbur <b>igia)</b> a(mera); PX5005 at
007 (¶ 6) (Zmijewski Rebuttal Report to Dr. Shehadi <b>ehi</b> c≉mera



(PX5003 at 015 ( $\P$  22) (Zijnewski Rebuttal Report to Stern and Imburgia) (

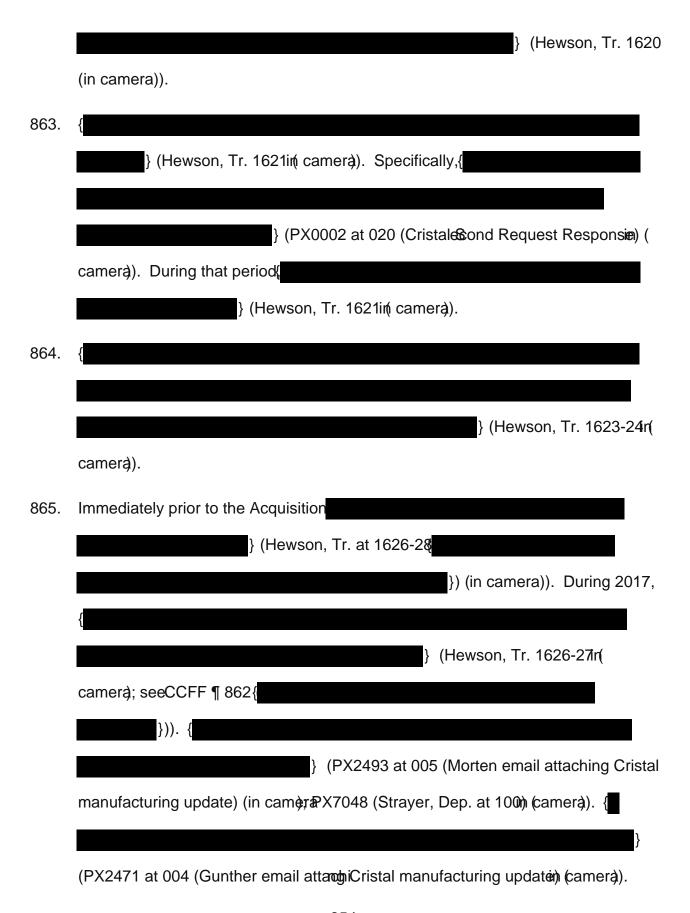
842.	Respondents claim a synergy related tprimming the performance of Yanbu, Cristal's
	chloride TiO2 plant in Saudi Arab(herein "Yanbu improvement synergy").
	{
	PX0005 at 018-19 (Synergies White)
	Paper) i(n camera

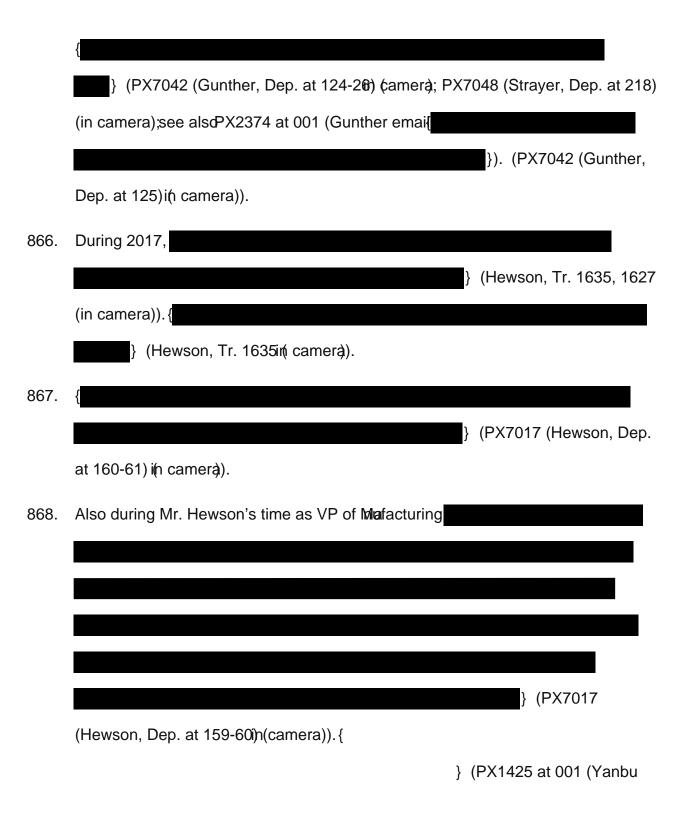
	} (PX7023
	(Dean, Dep. at 22-23)n(camera).
848.	{
	} (PX7023 (Dean, Dep. at 73-75n) (camera).
849.	{
	}
	(Zmijewski, Tr. at 1465-66in camera). If any underlying alculations exist,
	Respondents have not presented them.
850.	{
	}
	(Zmijewski, Tr. 1464-66i() camera); PX5001 at 029 (¶ 39 n.70) (Zmijewski Initial
	Report) (n camera); see alsoPX5003 at 044 (Appx C § 2 n.16) (Zmijewski Rebuttal
	Report to Stern and Imburgian (camera); PX5005 at 010 (¶ 11 n.16) (Zmijewski
	Rebuttal Report to Dr. Shehadelin) (camera).
851.	{
	} (PX1425 at 001 (Yanbu Improvement Plain) ﴿amera).



854. Located in Saudi Arabia, Yanbu is different of Hamilton in other ways that can affect productivity. {

	} (PX0006 at 006 (KPMG
	Report (n camera).
859.	{
	} (PX0006 at 005 (KPMG Reportin(camera)).
860.	{
	} Zmijewski, Tr. 1463 (in camera); PX5001 at 029 (¶ 39)
	n TdFm3 synergy is not Tc m3eTdP (rger-specific68 0 >>BD >>BDC BT 0 Tc 12 8 0 Tr 12 0





at 005 (Gunther email attaching Yanbu org changes)a(mera). 874. ) (PX2379 at 005 (Gunther email attaching Yanbu org change's) camera). 875. } (PX7048 (Strayer, Dep. at 117-18) camera; see alscPX7042 (Gunther, Dep. at 125-26n(camera)). 876. } (PX1501 at 001 (Dean email) (camera; see also PX7023 (Dean, Dep. at 128-30th (camera)). 877.

(Hewson, Dep. at 51-52)n(camera); PX7048 (Strayer, Dep. at 716) camera; PX2379

} (PX7042 (Gunther, Dep. at 134-35) ¢amera); see alsoDean, Tr. 3107-108 i(n camera); PX2471 at 007 (Gunther emattaching Cristal manufacturing update) i(n camera).

	} (PX7017 (Hewson,
	Dep. at 182)i( camera)).
883.	The Tronox Way, which Tronox plans to implent at Yanbu in order to improve
	performance, contains a number of asptats Respondents have not shown are merger-
	specific. {
	} (Dean, Tr. 3102in)
	camera). {
	} (Dean, Tr. 3102-06r( camera)). {
	} (Dean, Tr. 3103in camera).
884.	{ (PX7048 (Strayer, Dep. at
	219-220) (n camera). {
	} (PX2471 at 007 (Gunther
	email attaching Cristal manufacturing upda
	) (in camera); PX2390 at 005
	(Nackshabandi email atta <b>ch</b> board minutes) (samen) (camera); PX2493 at 005
	(Morten email attachim manufacturing update)
	}) (in camera); see alsoPX7042 (Gunther, Dep. at 133h) (
	camera).
005	ſ
885.	{
	\ (PY7012 (Mancini Den at

	steps to help improve thegamizational culture at Yanbu.
886.	{
	} (PX1502 (Dean email)r( camerà; PX7023
	(Dean, Dep. at 130-36)n(camera).
	(Dean, Dep. at 130 30), (camery).
887.	{ 
	} Zmijewski, Tr. 1472-76i() camera; PX5001 at 031-32 (¶ 43) (Zmijewski
	Initial Report) (n camera); PX5003 at 046-47 (Appx C §(Z)mijewski Rebuttal Report
	to Stern and Imburgia)r( camera); PX5005 at 028-30 (¶ 32) (Zmijewski Rebuttal Report
	to Dr. Shehadeh) (in came)
	iii. Tronox's Claimed Efficiency of Activatig the Jazan Slagger in Saudi Arabia Is Not Cognizable
888.	Respondents claim a synergy related to activating the Jazan slagger (herein "activating
	Jazan"). {

080-81) (n camera). Tronox has not demonstrated why Cristal could not take similar

PX7018 (Trabzuni, Dep. at 78)n (camera); PX7038 (Van Niekerk, Dep. at 123m) (camera).

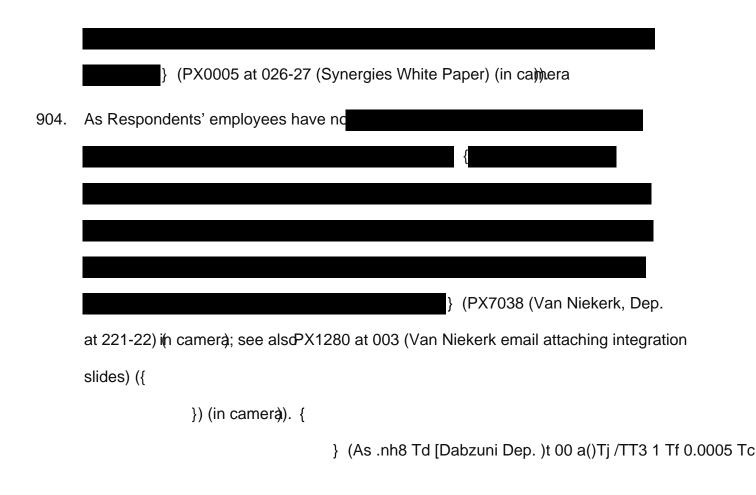
- (a) The activating Jazan synergy is speculative and not verifiable
  - (1) The option agreement highlighthe speculative nature of the activating Jazan synergy



} (PX7014 (Quinn, Dep. at 075-76)) (camera); (PX7008 (Hewson, IHT at 75)).



Furthermore, Tronox pursued an option agreemen

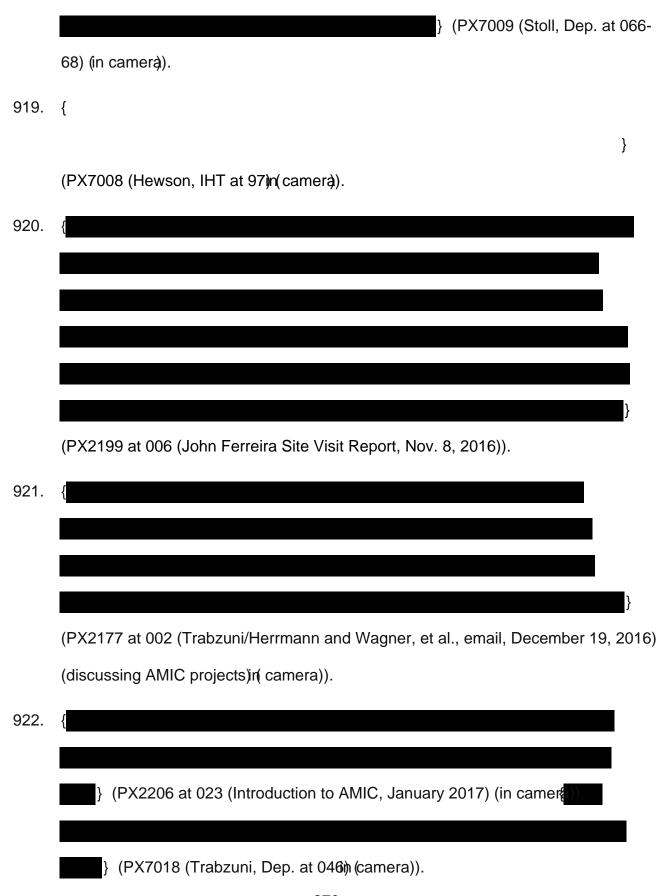


	site visit report)	
		<b>-</b>
	camera).	} (in
906.	{	
		} (PX7036

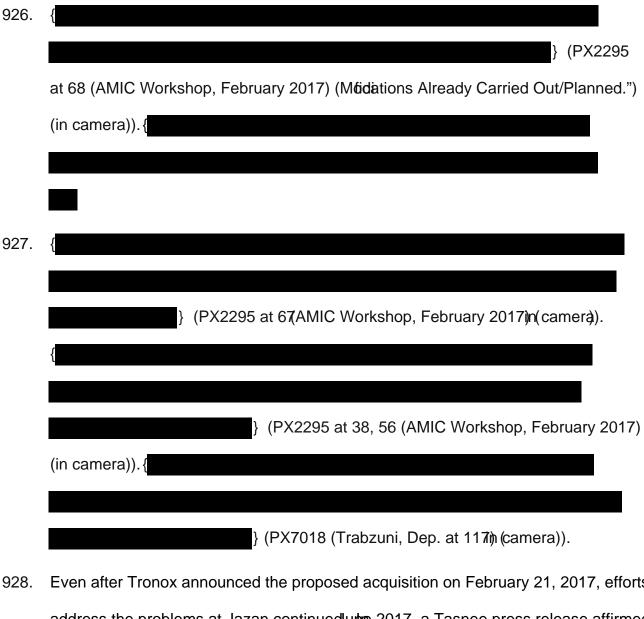
	PX2196 at 013 (Cristal Titaumin Slagger Project, September 2016) (n camera); PX7018 (Trabzuni, Dep. at 059th (camera); PX7005 (Keegel, Dep.
	at 71) (n camera).
910.	{ (PX7009 (Stoll, Dep. at 033)n(camera)).
	} (PX7006 (Stoll, IHT. at 243)in(
911.	camera).
	} (PX7008 (Hewson, IHT at 059) (n camera). {
	} (PX7008 (Hewson, IHT at 059-60)n(camera);
912.	(PX2166 at 002)in camera)).  Cristal has taken a number of steps towners for operations at the Jazan Slagger smelter facility independent Tronox acquiring Cristal. {

	} (PX1286 at 012 (Tronox
	presentation)in camera).
916.	{
	} (PX2204 at 3-5 (Cristal
	Titanium Slagger Update & Expectation AMIC-TiZir Collaboration, October
	2016) {
	}) (in camera). Dr. Trabzuni reported that that the meeting went well, and
	described the next steps. (PX2203 (Dr. Fadi Trabzuni/Mutlaq H. Al-Morished email)
	("TiZir to conduct a due diligence to viewrand confirm their thoughts on design
	modification requirement for Jazan stagger furnaces.")
917.	{

} (PX1079 at 0089(4a5Tj ET q 1 0 0



923.	{
	} (PX2236 (Livingston/Trabzuni et al. email chain) ¢amera))
924.	{
	} (PX2295 at 005 (AMIC Workshop, February 201in) (amera).
925.	{
	}
	(PX2295 at 037-54 (AMIC Workshop, February 201in) o(amera). {
	PX2295 at 056 (AMIC Workshop, February 201in) (amera); see
	also PX2177 at 040 (Tasnee Strategy and <b>Ghow</b> ixing the Jazan ilmenite smelter) ({
	} (PX7018 (Trabzuni, Dep. at 145-47) ¢amera)).
	j (171010 (110023111, Dop. at 110 111) parifora)).



- Even after Tronox announced the proposed acquisition on February 21, 2017, efforts address the problems at Jazan continued unite 2017, a Tasnee press release affirmed that "work is still ongoing to solve the thnical problems" at the Jazan slagger, projecting trial operation during the first half of 2018. (RP9029 (Tasnee Press Release on Jazan Slagger); PX7008 (Hewson, IHT. at 1011): (Merca); PX7005 (Keegel, Dep. at 71) (in camera).
- 929. While Tronox's Mr. Van Niekerk stated dug the Commission's nvestigation that

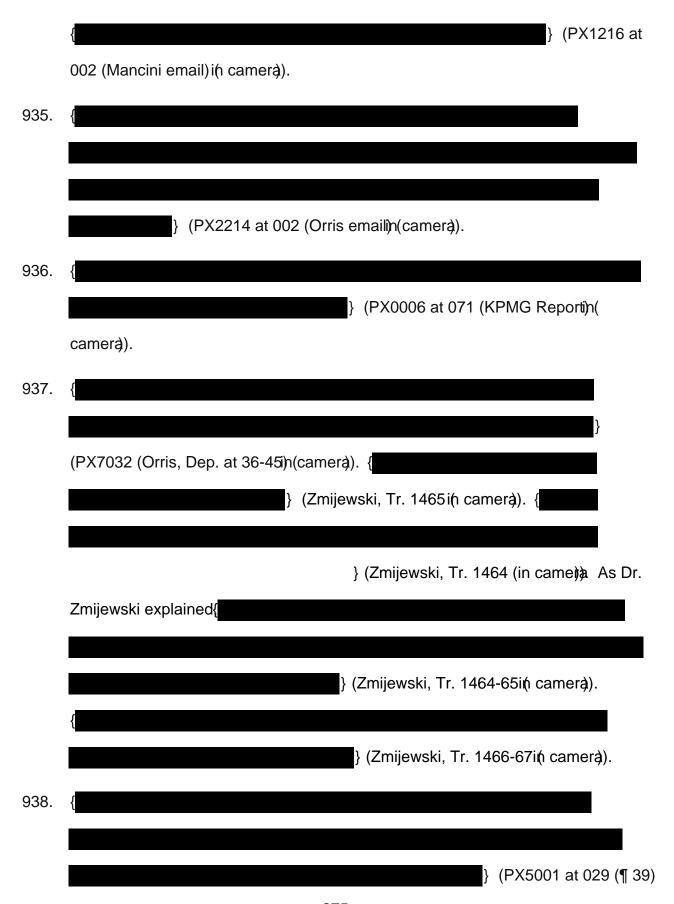
	} Tronox took the
	exact opposite positio
	(PX7007 (Van Niekerk, IHT, at 213)n(camera); PX1373 at 004
	}) (in camera)).
930.	There is no evidence that, prior to the Proposed Acquisi@ristal had abandoned its
	efforts to make the Jazan slagger operational. (PX7018 (Trabzuni Dep. €
	}) (in camera).
931.	
331.	Even in March 2017, in its Annual Report to to make the Jazan Slagger operational: "Tome pany aims to complete a series of
	projects under construction deplanned to enter the triperoduction phase during the
	second half of 2017, including thiteanium Smelter Project toproduce raw material (slag)
	to produce titanium dioxide (PX9090 at 20 (Tasnee Annual Report, March, 2017))
932.	{

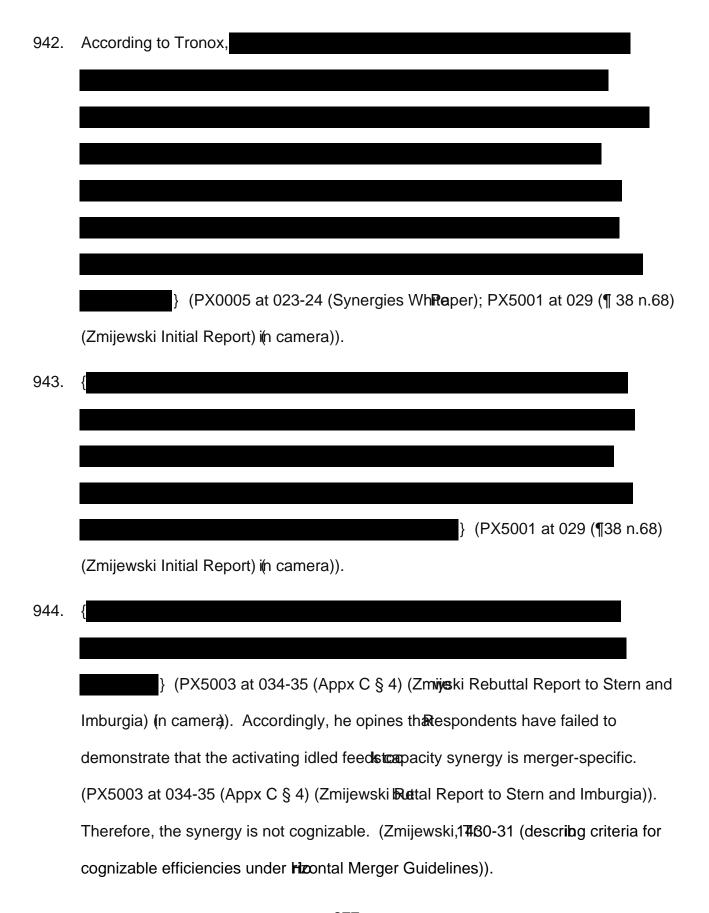
(Zmijewski, Tr. 1471-72iń camera); PX5001 at 030-31 (¶ 42) (Zmijewski Initial Report) (n camera); PX5003 at 051-52 (Appx B §(Zmijewski Rebuttal Report to Stern and Imburgia)r( camera); PX5005 at 034-35 (¶ 38) (Zmijewski Rebuttal Report to Dr. Shehadeh) (in came)a

iv. Tronox's Other Claimed Outputfliciencies Are Not Cognizable

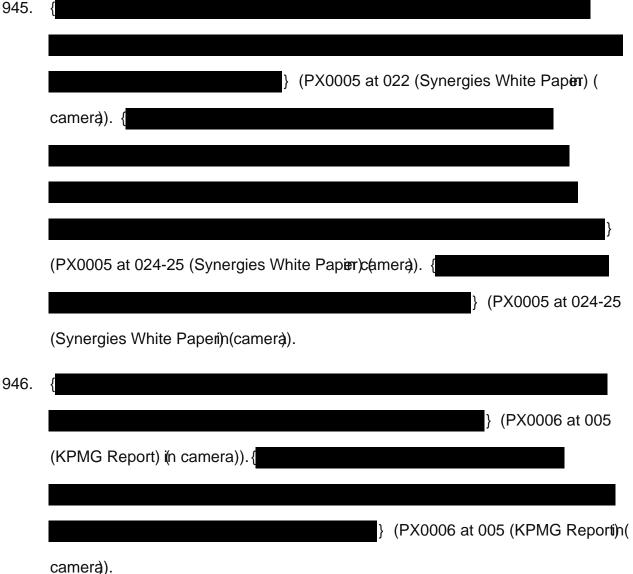
(a) Respondents' claimed synergy of applying best practices across TiO2 pigment plants is not cognizable

933.	{
	} (PX0005 at 019 (Synergies White Paper) (
	camera). {
	}
	(PX0005 at 019-20 (Synergies White Papier)c(amera). {
	) (DV4C4C, Notive at Tab E4 (Transay Cyrogray)
	} (PX1646_Native at Tab 54 (Tronox Synergy Spreadsheet)r( camera).
934.	{
	(PX1216 at 002 (Mancini email chairin camera))





(c) Respondents' claimed synergy of appring ilmenite between mines at reactivated slag furnaces is not cognizable



947. Because it relies on the assumption **ef al**otivating Jazan synergy, which is not verifiable, Dr. Zmijewski opines that the ilmenite swap synerge is not verifiable. (PX5003 at 032-33 (Appx C § 3) (Zmijewski Rebuttal Report to Stern and Imburgia); PX5005 at 017-18 (¶ 17) (Zmijewski RebuttalpRet to Dr. Shehadeh)). Therefore, the ilmenite swap synergy is not cognizable. (Zmijewski,17430-31 (describing criteria for cognizable efficiencies under **Hiz**ontal Merger Guidelines)).

948. Dr. Zmijewski also notes that Respondentschaot presented evidence that the ilmenite swap synergy could not practically be applished absent the proposed acquisition.

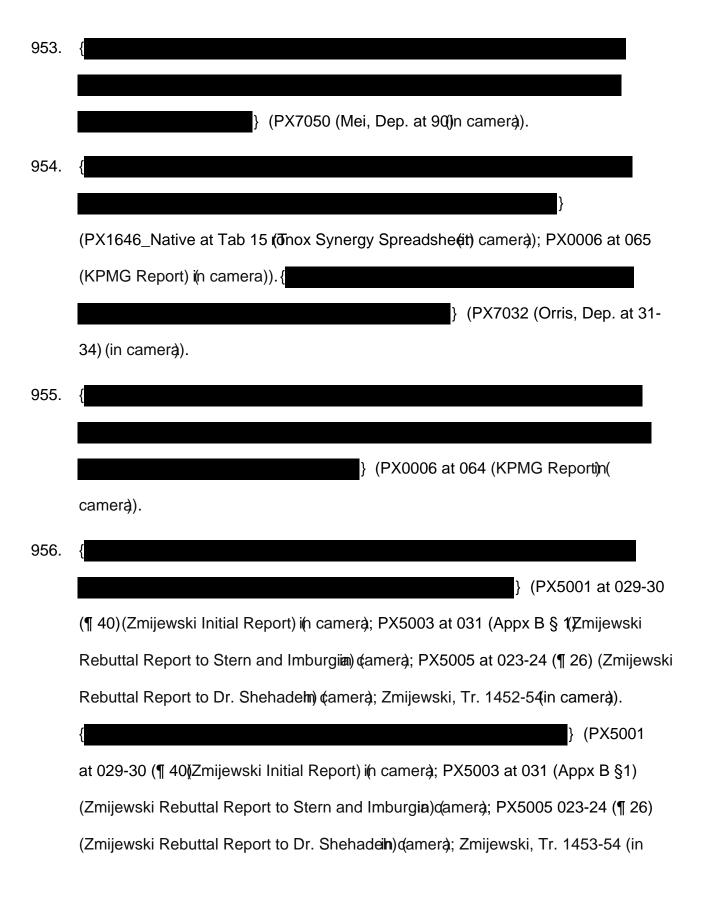
(PX5003 at 032-33 (Appx C § 3) (Zmijewski Rebuttal Report to Stern and Imburgia);

PX5005 at 035-36 (¶ 40) (Zmijewski Rebuttal Report to Dr. Shehadeh)).

v. Tronox's Claimed Cost Savings Efficiencies Are Not Cognizable

- (a) Respondents' claimed "value is" synergy is not cognizable 950. Respondents claim a synerglated to "value in use" of (PX0005 at 034Synergies White Paperi)n(camera)). { } (PX0005 at 034 (Synergies White Paper)o(amera). 951. ) (PX0006 at 064 (KPMG Report) (in came); aPX7050 (Mei, Dep. at 224) n camera)). ) (PX0006 at 064KPMG Report) in camera)). 952. ) (PX7036 (Keegel, Dep. at 41-42)

(in camera)).



camera). Therefore, the synergy is not cognized (Zmijewski, Tr. 1430-31 (describing criteria for cognizable efficiencies **de**r Horizontal Merger Guidelines)).

- (b) Respondents' claimed "optimize pigmteogistics cost" synergy is not cognizable
- 957. Respondents claim a synergy relate@tototimize pigment logistics cost" off
  } (PX0005 at 034Synergies White Paperi)n(camera)). They
  describe this synergy 4s

{

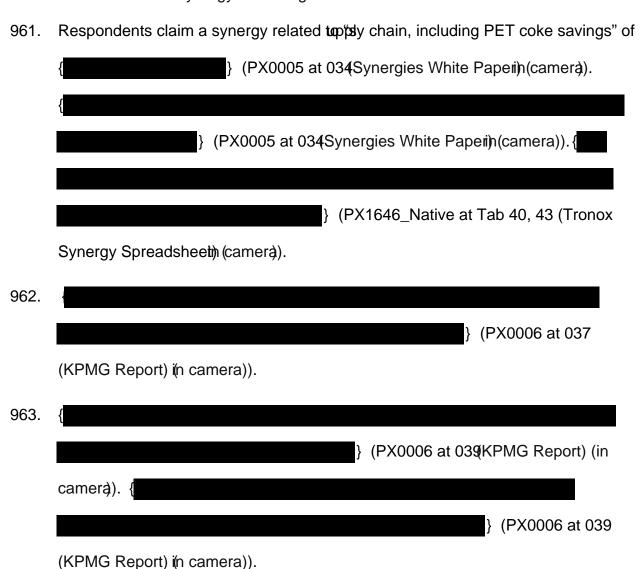
} (PX0005 at 034Synergies White Paperi)n(camera)).
958. {

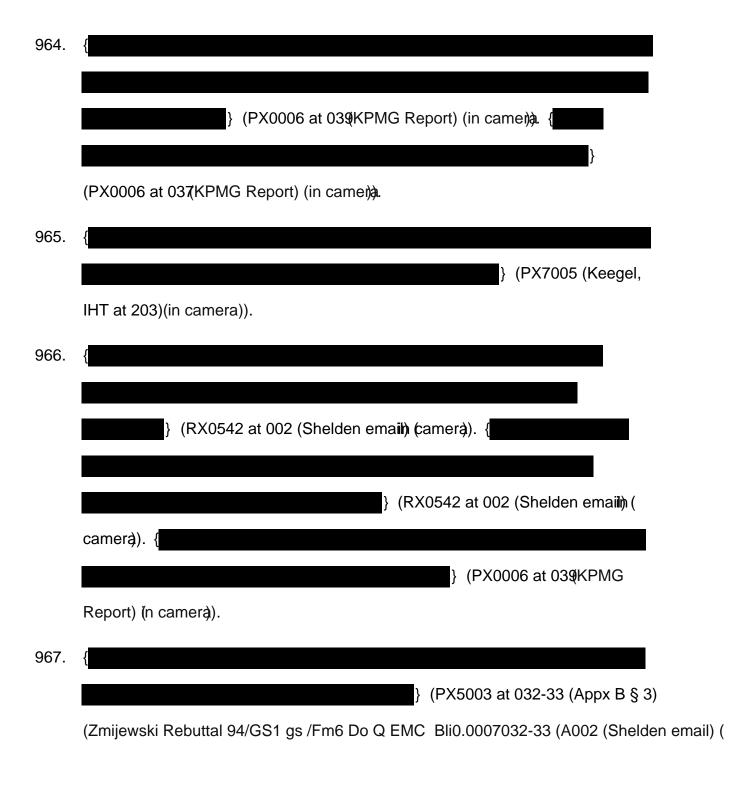
} (PX1646\_Native at Tab 34 (Tronox Synergy Spreadshieet)a(mera).

) (PX0006 at 080 958.

(Zmijewski Initial Report) i(n camera) PX5003 at 032 (Appx B § 2/Zmijewski Rebuttal Report to Stern and Imburgian) (camera); PX5005 at 024 (¶ 27) (Zmijewski Rebuttal Report to Dr. Shehadelm) (camera). Therefore, the synergy is not cognizable. (Zmijewski, Tr. 1430-31 (describing criteriarfoognizable efficiencies under Horizontal Merger Guidelines)).

(c) Respondents' claimed "supply cha**in**cluding PET coke savings" synergy is not cognizable



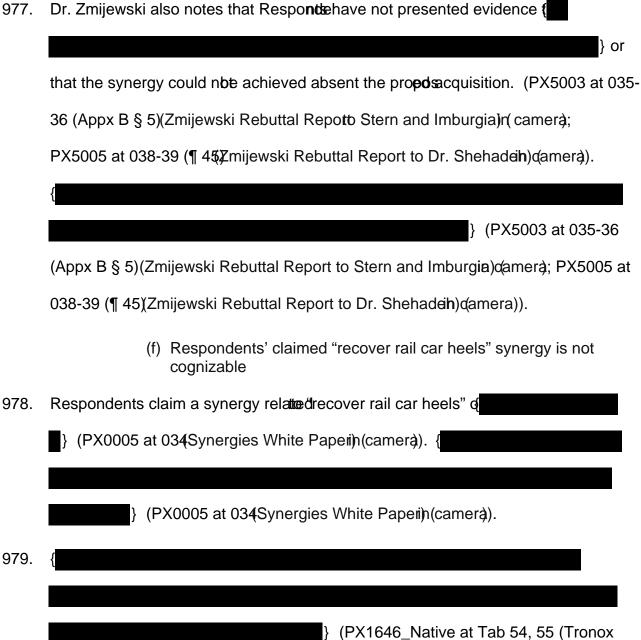


synergy is not cognizable. (Zmijewski, Tr

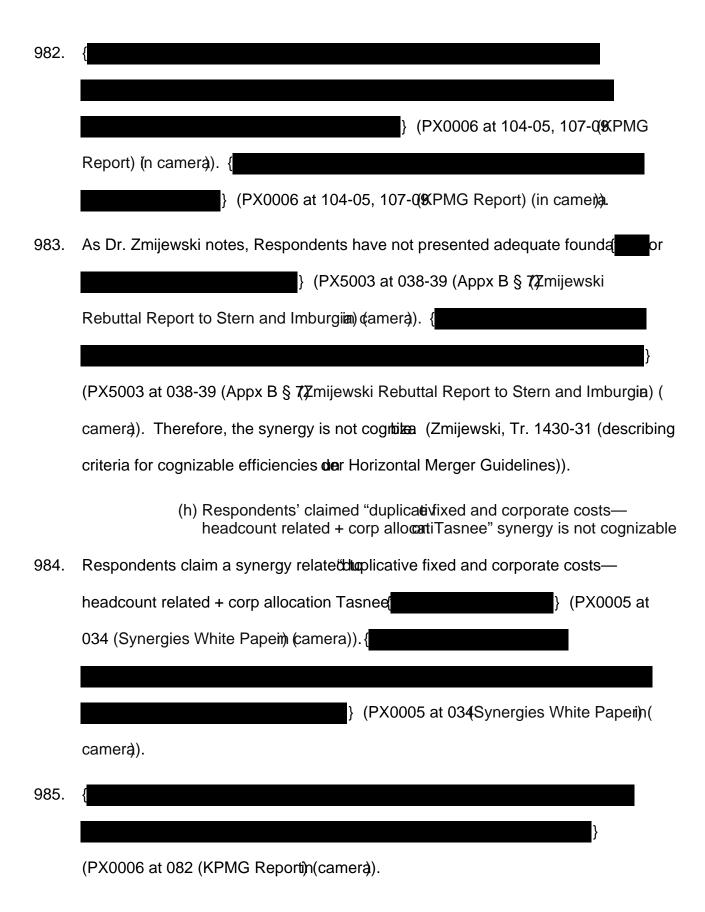
	35 (Appx B § 4)(Zmijewski Rebuttal Repotto Stern and Imburgia)r(camera);
	PX5005 at 037-38 (¶ 44∑mijewski Rebuttal Report to Dr. Shehadeih) (amera).
	{
	} (PX5003
	at 034-35 (Appx B § 4)Zmijewski Rebuttal Repoto Stern and Imburgia) (in camèra
	PX5005 037-38 (¶ 44(Zmijewski Rebuttal Report to Dr. Shehadeih) (amera).
	(e) Respondents' claimed "optimize chiloator control" synergy is not cognizable
975.	Respondents claim a synergy relatedoptimize chlorinator control" of
	} (PX0005 at 034Synergies White Paperi)n(camera)). {
	} (PX0005 at 034Synergies White
	Paper) i(n camerà).
976.	{

synergy is not cognizable. (Zmijewski, Tlr430-31 (describing criteria for cognizable efficiencies under Horizoat Merger Guidelines)).

Dr. Zmijewski also notes that Respondence for cognizable evidence for cognizable efficiencies under Horizoat Merger Guidelines).



	(Zmijewski Rebuttal Report to Dr. Shehada <b>h</b> )damera). {
	} (PX5003 at 036-37 (Appx
	B § 6) (Zmijewski Rebuttal Report to Stern and Imburgia) (amera); PX5005 at 024-
	25 (¶ 28)(Zmijewski Rebuttal Report to Dr. Shehadah) (amera). Therefore, the
	synergy is not cognizable. (Zmijewski,. 7lr430-31 (describing criteria for cognizable
	efficiencies under Horizoat Merger Guidelines)).
980.	{
	} (PX7023 (Dean, Dep. at 139-4@) camera;
	PX1505 at 002 (Gilman email chai(iii) camera)) {
	} (PX5001 at 032-33 (¶ 4 <b>4</b> ≵mijewski Initial
	Report) (n camera); PX5003 at 036-37 (Appx B § €Zmijewski Rebuttal Report to
	Stern and Imburgia)n camera; PX5005 at 039 (¶¶ 46-472 mijewski Rebuttal Report
	to Dr. Shehadeh); Zmijewski, Tr. 1470-7/1 ¢amera).
	(g) Respondents' claimed "duplicativiexed and corporate costs—3rd party spend" synergy is not cognizable
981.	Respondents claim a synergy relate(
	} (PX0005 at 034Synergies White Paperi)n(
	camera). {
	} (PX0005 at 034Synergies White Paperi)n(
	camera).



affect the pricing of TiO2 in North America. (Hill, Tr. 1891-92
} (PX5002 at 025 (¶ 50) (HiRebuttal Report to Stern and
Imburgia) (n camerà; PX5000 at 121 (¶ 28
}) (in camera); PX1012 at 045 (Tronox prestation) (describing
{ (in camerà).
Over last several years, Tronbas sought to "hold price," rath than be an aggressive
competitor in TiO2 by increasing its outputstead, Tronox has curtailed its production
on multiple occasions.See CCFF ¶¶ 587-612, above). Topolinas used its production
decisions at both the feedsk level and for TiO2 to pigment to limit supply and
maintain pricing – and those decisioppears to have contributed to reduced
competition at each level of the industree CCFF ¶¶ 606-10, above).
At the feedstock level, for example, Tronox2i014 concluded the
The title recuested in the restaining of the res

995.

996.

	} (PX1628 at 003
	(Turgeon email attaching Memo to Tronox Boaid)ɗamerà). {
	} (PX1112 (Email between Casey and Romano) (in ca))nera
997.	{
	} (PX1394
	at 003 (Van Wyk email attaching memir) (camera). {
	} (PX1394 at
	006 (Van Wyk email attaching memoin) (camera)). Tronox at the beginning of 2015

producers: "We think that the second quarter 2014 was the low point in high-grade feedstock prices, and in factath prices in this quarter and in the second half of 2014 were higher than in the second quarter of 2014 corrange slag prices around the world. That is in part, we believe again, because we have from the market. I think Rio responded to that by withdrawing from the

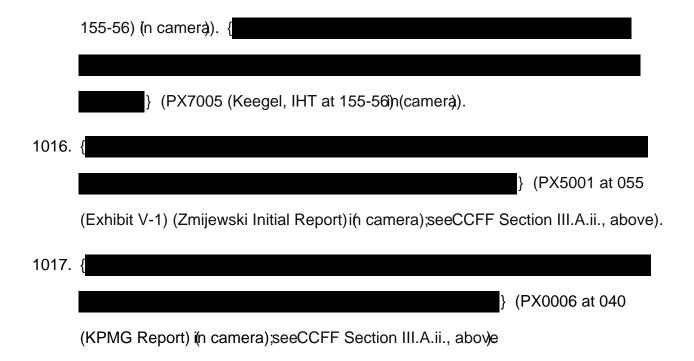
1004.	As reflected in a wide range of ordinargurse business documents, including high-level
	planning document
	} (PX1362 at 002 (2012 Board Presentation)c(mera). {
	PX1370 at 047 (Staton email attaching Tronox 2014 5-Year
	Business Plan)ir( camera). {
	}
	(DV1200 at 012 (Keepel ampitta shing presentation))
	(PX1380 at 012 (Keegel emailtaching presentationin(camera).
1005.	Immediately after Tronox acquired Exxasse(PX1097 at 001-09 (October 2011 Tronox
	investor presentation){
	} (PX1034 at 001 (Van Niekerk emailin (camera)).
1006.	When Tronox acquired Exxaro in 2012, Tronox also emphasized the opportunity for
	organic pigment expansion in public disclosures. For example, an October 2011 Investor
	Presentation describ

	(PX1097 at 009 (Tronox in set or presentation)).	
1007.	In a 2014 presentation, Tron	
	} (PX1377 at 014 (Presentation to Anixter	
	International) i(n camera). {	
	} (PX1377 at 014 (Presentation to Anixte	1
	International) i(n camera).	

viewed its vertical integration as a foutide for organic expansion of TiO2 pigment production. Specifically, in 20112 r. Casey stated that "[treg long on feedstock] also provides us the opportunity if we were exceptance either though acquisitions or brownfield expansions, we can feed the earnsion with our own feedstock and even increase the advantage that howeve so it gives us a lot of flexibility. We like that."

(PX9033 at 014 (Tronox Q2 2012 Earnings Call)) year later he stated that "the way we think about it is that if we invest in, for examplificamilton, our plant in Mississippi or in Botlick [sic] or even in Kwinana, the plant in Australia, we could add lines incrementally. And so our choice would the we add one line, do we add two lines, do we do a substantial increase? ... Dathwick that the — that an acquisition that is available to us is impactful sufficiently fan advance of the financial impact of incremental expansion that it's worth doing daparticulaw -25.Tj 0.0004 Towi4 Tc -0.002 w 89 Td

any organic. As I said earlier, my inclinanti is to go to — at least the short term to
look at the inorganic rather th



In defining an antitrust product market, countersider "such practical dicia as industry or public recognition of the [relevant market] a separate economic entity, the product's peculiar characteristics and uses, unique product cilities, distinct customers, distinct prices, sensitivity to price chaes, and specialized vendors: TC v. Whole Foods Mkt., Inc., 548 F.3d 1028, 1037-38 (D.C. Cir. 2011) (quotargwn Shoe, 370 U.S. at 325); see also: TC v. CCC Holdings, Inc.

TiO2 that would allow chloride TiO2 customs to decrease their reliance on the product in sufficient quantities to ender a SSNIP unprofitable FTC v. Syscol 13 F. Supp. 3d 1, 33 (D.D.C. 2015). The evidence that Complaint counsel introduced to establish chloride TiO2 to be the relevant markochluded public disclosures of Respondent Tronox. See SEC Rule 10b-5 (17 C.F.R. § 240.10b-5) (which forbids, among other things, the making of any "untrue statements of fact" or the omission of any material fact "necessary in order to make statements made . . . not misleading.").

16. For most customers in North America, sulfate TiO2 is not an effective substitute for chloride TiO2, because: 1) chloride TiO2opides distinct performance advantages over

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Polypore, 150 FTC 586, \*15 (2010) (citifægown Shoe370 U.S. at 336). "Where suppliers can set prices based on customoration, and customers cannot avoid targeted price increase through arbitrage policies may be able to exercise market power over customers located in a partiaulgeographic region, even afprice increase to customers located in other geographic re

Spirit Airlines, Inc,

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demonstrate that relevant markets are 'tregi in scope"). Moreover, North American customers overwhelmingly consume chloride TiO2 that is produced in North America.

D. THE ACQUISITION IS PRESUMPTIV

- the best measure of attractiveness to custorsience, they reflect threal-world ability of firms to surmount all of the obstacles necessa offer products on terms and conditions that are attractive to customers! Orizontal Merger Guidelines 5.2.
- 25. Courts employ a statistical measure cathed Herfindahl-Hirschman Index (HHI) to measure market concentration bee, e.g., Hein 2,46 F.3d at 716. This index calculates market concentration by summing the squares of the individual market share of each market participant. See Systo3 F. Supp. 3d at 52 Inder the Horizontal Merger Guidelines a merger is presumptively unlawfulitifincreases the HHI by more than 200 points and results in a post-merger HHI exceeding 2,500 ger Guidelines § 5.3see also Heinz, 246 F.3d at 716-19 ysco, 113 F. Supp. 3d at 52 aples 970 F. Supp. at 1081-82.
- 26. Evidence presented at the hingrindicates that Tronox's proposed acquisition of Cristal would increase the HHI in the market for North American chloride process TiO2 by more than 600 points. It would result inpost-merger HHI in excess of 3,100 and a post-merger market share of greater than 30%. Therefore, the merger is presumed "likely to enhance market power," unless "rebutted by persuasive evide@ee.Heinz, 246 F.3d at 716-17 (HHI increase of 510 points createssumption of harm "by a wide margin").
- 27. The market shares and HHI levels here are parable to the levels found to be unlawful by courts. InFTC v. University Healthinc., 938 F.2d 1206, 121(91th Cir. 1991), the court found that the FTN2ad "clearly established parima faciecase of anticompetitive effect" when it proved that a merger of two nonprofit hospitals would have reduced the number of competitors fficing to four and resulted in a combined share of about 43 percent, an increase thin of over 630, and a post-merger HHI of

coordination is feared by tatroust policy even more that press collusion, for tacit coordination, even when observed, cannot etasil prontrolled diretally by the antitrust laws. It is a central object of merger police obstruct the cretain or reinforcement by merger of such oligopolistic market structures in which tacitationation can occur." Heinz, 246 F.3d at 725 (emphasis added) (quoting 4 Phillip E. Areeda, Herbert Hovenkamp & John L. Solow, Antitrust Law ¶901b2, at 9 (rev. ed. 1998)).

- 30. The evidence presented at the hearing circles that the market for North American chloride TiO2 is already ghly concentrated, and the mergyould significantly increase that concentration. High levels of concetiona exacerbate the risk of coordination in the market. See FTC v. Elder rain, Inc., 898 F. 2d. 901, 905 (7th Cir. 1989) (acquisition from six to five makes it easter leading members of the industry to collude on price and output TTC v.Univ. Health, Inc., 938 F.2d 1206, 1219 (11th Cir. 1991) (four remaining usinesses could easily collude to raise price and decrease output without committing detectable violations of the Sherman Act).
- 31. In addition, the market for North Americanlorhide TiO2 is already vulnerable to, and shows a history of, coordination. Decisions in Valspar Corp. v. E.I. du Pont de Nemours & Co., 873 F.3d 185 (3rd Cir. 2017) ahrdRe Titanium Dioxide Antitrust Litig., 959 F. Supp. 2d 799 (D. Md. 2013), indicate likely presus coordination in the North American TiO2 market. InValspar, the Third Circuit stated: "There no dispute that the [TiO2] market was primed for anticompetitive independence and that it operated in that manner." Valspar, 873 F.3d 185 at 197. Likewisshe District Court of Maryland held that "[t]he record contains ample evidence foncbuding that the [d]efendants agreed to

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collusive communications in hooke-filled rooms" in order to state a § 1 Sherman Act claim. Rather, such collusive communicationass be based upon circumstantial evidence and can occur in speeches at industry exemifces, announcements of future prices, statements on earnings callist, d in other public ways.").

- ii. The Acquisition Increases the Likelihoodaot Inilateral Reduction in Chloride TiO2 Output
- 34. The combined firm would have not only the ams to hold back chloride TiO2 from sales to North Americancustomers, but also would have the incentive to suppress output unilaterally. SeeUnited States v. Rockford Mem'l Corp 17 F. Supp. 1251, 1279 (N.D. III. 1989), aff'd, 898 F.2d 1278 (7th Cir. 1990).

- 715 (alterations in original) (quotinum ited States Citizens & S. Nat'l Bank422 U.S. 86, 120 (1975)).
- 37. Respondents' burden is heavy, given thrength of Complaint Counse bisima facie case. The stronger threima facie case, the more evidence defendants must present to rebut the established presumptionic See Syscol 13 F. Supp. 3d at 23.
- 38. Respondents therefore needed to demonestistatuctural barrier, unique to this industry, that are sufficient to defeat the 'ionady presumption of collusion' that attaches to a merger in a highly concentrated marking, 246 F.3d at 725." Instead, however, the significant evidence of potential contribive harm presented at the hearing corroborates the competitive concerns that are at the core of the presumption.
  - i. Respondents Cannot Show That Entry Expansion by Other Firms Will Counteract the Anticompetitive ffects of the Transaction
- 39. Respondents "carry the burden to show that of expansion is sufficient 'to fill the competitive void that will result if [defendants are] permitted to purchase' their acquisition target."H&R Block, 833 F. Supp. 2d at 73 (alternals in original) (quoting Swedish Match, 131 F. Supp. 2d at 169); also Staple \$970 F. Supp.; E [(com)8.8itficino presunt)

- 40. To meet their burden, Respondents must sthrativentry or expansion would be "timely, likely, and sufficient in its magnitude, charactand scope to deter or counteract the competitive effects of concern. H&R Block, 833 F. Supp. 2d at 73 (quoting Merger Guidelines 9); see also CCC Holding 605 F. Supp. 2d at 47.
- 41. Evidence presented at the hearing indicates entry by any ne TiO2 producer is unlikely. Moreover, expansion by producersed in China is unlikely to offset the competitive harms of the acquisition. Almost no chloride TiO2 comes from China to the North American market. Indeed, the vast majority of production in China is sulfate TiO2, which is outside the relevant markeths with their other ebuttal arguments, Respondents bear the burden of demonstration ability of other distributors to 'fill the competitive void that will result from the proposed merger'sco 113 F. Supp. 3d at 80). Respondents must show at least as treable probability of sufficient entry." Chi. Bridge, 534 F.3d at 430 n.10See also In re Chi. Bridge & Iron Co., 138 F.T.C. 1024, 1071 (2005) "the mere fact that new entrants afringe firms have an intent to compete does not necessarily mean that those significant competitors capable of replacing lost competition" And to the extent that uestainty exists about potential future entry or expansiondoubts are to be resolved ainstthe transaction."FTC v. Elders Grain, Inc. 868 F.2d 901, 906 (7th Cir. 1989) (emphasis added) ( offinia. Nat'l Bank, 374 U.S. at 362-63).
- ii. Respondents' Efficiencies Claims Do Not Rebut the Presumption of Illegality
  42. Respondents bear the burden of proving capple efficiencies of a character and magnitude sufficient to ensure that the meigerot likely to beanticompetitive in any relevant market. See H&R Block33 F. Supp. 2d at 89; Horizontal Merger Guidelises

- 10. Cognizable efficiencies must be mergpesific, verified, and not the result of anticompetitive reduction output or serviceHorizontal Merger Guideline§ 10. No court has ever relied on efficiencies to the an otherwise unlawful transaction ee CCC Holdings 605 F. Supp. 2d at 72. Given the high rate concentration levels in this case, Respondents need to the proof of extraording refficiencies" to rebut the presumption of likely anticompetitive effects. United States v. A 21402 F. Supp. 3d. 1, 98 (D.D.C. 2017) citing Heinz, 246 F.3d at 72
- 43. Claimed efficiencies are not gnizable unless they are) (Interger-specific," and (2) "reasonably verifiable by independent party. Staples IJ 190 F. Supp. 3d at 137 n..15 Respondents must prove "merger-cipeity and verifiability" of all claimed efficiencies.

  Anthem, 855 F.3d at 364 see also Hein 2246 F.3d at 722.
- A4. Respondents have failed to demonstratetheit claimed efficiencies are merger-specific because significant points of their claimed cost sangs appear to be achievable independent of the mergenta R Block, 833 F. Supp. 2d at 90. Furthermore, most of the claimed efficiencies are out-onfarket efficiencies, as the plate to products, sales and operations outside of the relevant markete Horizontal Merger Guidelin \$10 n.14.; see also Phila. Nat'l Bank 74 U.S. 371 (1963) (rejecting claim anticompetitive merger would bring benefits outsie the relevant market that, among other "analytic flaws," were "unmoored from the actual market at issue").
- 45. To be verifiable, the claimed efficiencies require "clear evidence is lightwat the merger will result in efficiencies that will offset than ticompetitive effects and ultimately benefit consumers." Penn State Hersh 898 F.3d 327 at 350t is incumbent upon

Respondents "to substarte efficiency claims" so that and ependent party "can verify by reasonable means the likelihood and magnitude of each asserted efficiency . . . and why each would be merger specific for izontal Merger Guidelines 10. Respondents have failed to substantiate their asserted iefficy claims because they rely heavily on assumptions and on the business judgment for executives, and as such, are not subject to reasonable verification her H&R Block 33 F. Supp. 2d at 91 ("While reliance on the estimation and judgment referenced executives about costs may be perfectly sensible as a business tter, the lack of a verifiable method of factual analysis resulting in the cost estimates renders them not cognizable by the Court.")

46. Further, Respondents must demonstrate the projected savings from the merger are enough to overcome the evidence showing plassibly greater benefits can be achieved by the public through existing, continued competition States v. Aeth 240 F.

- 49. Once Complaint Counsel has established **ation** of Section 7, **'la**doubts as to the remedy are to be resolved in its favo**b**'hited States v. E.I. du Pont de Nemours &, Co. 366 U.S. 316, 334 (1961).
- The Commission has broad discretion to sederet medy so long as it bears a "reasonable relation to the unlawful practice found to exist läcob Siegel Co. v. FŢG27 U.S. 608, 611-13 (1946).
- 51. The proper remedy is an Order prohibitimely arransaction between Tronox and Cristal pursuant to the Transaction Assertment between Tronox and Cristal.
- 52. The Order entered hereinafter is necessardy appropriate to render the violations of law found to exist.

Respectfully submitted,

Dated: August 14, 2018

/s/ Dominic Vote
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## IN THE MATTER OF TRONOX/CRISTAL USA DOCKET NO. 9377

### COMPLAINT COUNSEL'S WITNESS INDEX

		COMPLAINT COUNSEL	.5 WITHESS INDEX				i
NAME	TITLE	COMPANY	TRANSCRIPT CITE **TOTAL**	TRANSCRIPT CITE **IN CAMERA **	DATE	VOLUME	I
Complaint Counsel Opening Statement	N/A	N/A	06:05 - 66:20	N/A	5/18/2018	Vol. 1	I
Respondents' Counsel Opening Statement	N/A	N/A	69:06 - 145:10	N/A	5/18/2018	Vol. 1	I
John Vanderpool	Director of Paint Operations	True Value	153:09 - 255:05	188:01 - 215:15 225:01 - 254:12	5/18/2018	Vol. 1	I
Paul Malichky	Director of Raw Material Sourcing	PPG Industries	267:04 - 629:05	283:01 - 333:17 352:01 - 434:05 437:01 - 499:19 502:01 - 550:09 571:06 - 622:12	5/23/2018 5/24/2018		
George Young	Senior Vice President of Global Procurement and Supply Chain	Sherwin Williams	630:02 - 742:12	656:20 - 695:05 701:11 - 742:12	5/24/2018	Vol. 3	I
Brian Christian	Executive Vice President	Kronos	744:01 - 962:07	799:20 - 843:09 910:01 - 958:14	5/24/2018 5/25/2018		I
Mario Pschaidt		Masco Coatings Corporation	963:05 - 1051:04	977:01 - 1030:25 1040:23 - 1049:25	5//25/2P\$8	448 0 TD 52 >>BD <b>©</b> /A\\$	.363 0 6a 579
							I
							I
							I

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# COMPLAINT COUNSEL'S EXHIBIT INDEX

# IN THE MATTER OF TRONOX/CRISTAL USA DOCKET NO. 9377 COMPLAINT COUNSEL'S DEMONSTRATIVE INDEX Exhibit No. Description BegBates EndBates Witness Date Introduced

Dated: August 14, 2018 By: /s/Blake Risenmay

BlakeRisenmay

Counsel Supporting the Complaint

### CERTIFICATE FOR ELECTRONIC FILING

I certify that the electronic copy sent to **Sec**retary of the Comission is a true and correct copy of the paper originand that I possess a paper ionaid of the signed document that is available for review by the parties and the adjudicator.

August 14, 2018 By: <u>/s/Blake Risenmay</u>

BlakeRisenmay

Counsel Supporting the Complaint