THE COMPETITION TRIBUNAL

IN THE MATTER OF the *Competition Act*, R.S.C. 1985, c.C-34, as amended;

AND IN THE MATTER OF the proposed acquisition of Tervita Corporation by Secure Energy Services Inc.;

AND IN THE MATTER OF an Application by the Commissioner of Competition for an order pursuant to 92 of the *Competition Act*;

AND IN THE MATTER OF an Application by the Commissioner of Competition for an interim order pursuant to section 104 of the *Competition Act*;

B E T W E E N:

COMMISSIONER OF COMPETITION

Applicant

- and -

SECURE ENERGY SERVICES INC

Respondent

EXPERT REBUTTAL REPORT OF NATHAN H. MILLER, PH.D.

April 11, 2022

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1. ASSIGNMENT

1. In March 2021, Secure and Tervita ("the Parties") announced a merger agreement that consummated in July 2021 ("the Transaction"). Prior to the merger, Secure and Tervita operated independent facilities that provided waste management services to oil and gas producers.

2. I have been asked by the Competition Bureau ("Bureau") to provide an independent economic assessment of the competitive implications of the proposed merger between Secure Energy Services Inc. ("Secure") and Tervita Corp. ("Tervita"), as well as the deadweight loss, if any, caused by the transaction.

2. SUMMARY OF OPINIONS

3. The price impact findings in my Initial Affidavit fundamentally rest on the features of waste management services markets in the WCSB. They are not driven by specific modelling assumptions. I used a second-score auction model to capture the widespread industry practice of price discrimination. I view the second-score auction to be a reasonable way to model markets where there is widespread price discrimination. With high margins and market shares observed in this industry other economic models would also predict high price impact.

4. Dr. Duplantis' "natural experiment" analysis does not provide appropriate estimates for the potential price effects in this merger.

5. The concept of potential welfare loss from loss of customer choice (facility closures in this case), and economic techniques to quantify it are well-established in the economics literature. In my Initial Affidavit, I presented several different approaches to estimate this source of deadweight loss ("DWL"). In this industry where facilities are differentiated and have margins, closure of facilities would create DWL (even if volume does not decline) because some customers would lose their most preferred option and would use less preferred options.

3. RESPONSES TO CRITICISMS OF PRICE EFFECTS

3.1. The findings in my Initial Affidavit fundamentally rest on market features (high market shares and margins), not specific modeling assumptions

6. Dr. Duplantis critiques the findings in my report that the merger will create a significant price increase in waste service costs. Her critique of the estimated price effects largely rests on the modeling assumptions; she purports that the model (i.e., the second-score auction) has unrealistic assumptions.[1] Before I address her arguments in detail, let me clarify that my primary conclusion on the price impact of the merger follows directly from the fundamental economic characteristics of the industry, and not from the modeling assumptions that Dr. Duplantis criticizes.

7. In this industry, the Parties exhibit high market shares and margins. Customers view Secure and Tervita facilities as each other's closest substitutes relative to other options, indicating high diversion between them. Under these circumstances, economic models would generally predict substantial price effects from the merger of the largest two suppliers in the absence of significant mitigating factors.[2] Dr. Duplantis does not fundamentally dispute these market facts. She seems to agree that the Parties have large market shares, and she does not criticize the market definition from my report or estimates of market shares. She also does not claim that the diversion ratios between Secure and Tervita facilities are low. Relying on Mr. Harington, she seems to claim that the margin calculations should be revised (i.e., that there are additional variable costs that should be taken into account). Even if I incorporate these additional costs, margins remain high. With these market facts, economic theory indicates that the merger is likely to have significant price effects. That is, indeed, what I find with the baseline model that I used in my Initial Affidavit. I also discuss another common modeling framework that relaxes the assumptions Dr. Duplantis criticizes, and explain that it, too, would predict large price impacts with the observed market shares and margins.

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[1] Affidavit of Dr. Renée M. Duplantis, March 25, 2022 ("Duplantis Affidavit"), Section III.A.2.

[2] Miller, N.; Sheu, G., "Quantitative Methods for Evaluating the Unilateral Effects of Mergers," Georgetown University McDonough School of Business Research Paper Series, July 2020. ("…effect of a merger on unilateral pricing incentives depends on two main objects: diversion and margins.").

8. To see the importance of market shares and margins, consider the pricing incentives from a merger.[3] Prior to the transaction, when a firm contemplates a price increase, it faces a trade-off. On the one hand, if the firm increases the prices of its service, it will earn more on its sales, increasing its revenue and profits. On the other hand, some customers will react by moving their purchases to competitors. These customers would be lost to the firm, reducing the profitability of its price increase. A profit-maximizing firm balances these two considerations when deciding its optimal pricing strategy.

9. A merger changes the calculus. When the firm acquires one of its competitors, it is able to recapture the customers who switch to the acquired firm's services in reaction to price increases. This reduces the profit loss associated with price increases. As a result, a price increase that was not profitable before the transaction can become profitable after the transaction. The incentive to raise prices after a merger is greater, the greater is the fraction of switching customers that the merged firm is able to recapture. Economists refer to this fraction as the "diversion ratio."[4] The incentive is also greater, the greater the merging firms' price-cost margins, as that determines the value of each customer that is recaptured through diversion. All else equal, the diversion ratios and margins are likely to be higher if the merging firms have large market shares.

10. Most models where the acquiring firm recaptures customers who switch from the acquired firm and will make positive profits from them will find price increases (in the absence of marginal cost savings).[5] The *magnitude* of such predicted price increases depends on the observed market shares and margins in the data. The fact that the model I used predicts a large price increase is a

[3] While in the following paragraphs I describe the merger incentives in the context of a standard posted-price framework, the same input variables, i.e., high margins and market shares, are the driving factors in my second-score auction framework regarding post-merger pricing incentives. With high margins and market shares, both modeling frameworks predict large post-merger price impacts, even if the underlying modeling mechanisms are different. In a second-score auction framework, the merger leads to a higher price increase if the merging firms are the best two options for many customers, as indicated by high diversion ratios (which can be estimated from market shares). I demonstrated that the merging parties are typically the best two options for many customers by presenting share-based diversion ratios in my Initial Affidavit that were generally large. See Affidavit of Nathan H. Miller, Ph.D., February 25, 2022 ("Miller Initial Affidavit"), Section 5.2.2. As such, higher market share leads to a higher predicted price increases. Higher margins lead to higher predict price increases because higher margins indicate more differentiated products, and therefore a bigger gap between the second and third options. Recall than in the second-score auction, prices increase from a merger between the first and second ranked bidders equals the difference between the valuations of the second and third-ranked bidder.

[4] Werden, Gregory J., and Luke M. Froeb. "Unilateral competitive effects of horizontal mergers," available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=927913 (2006): 1-95.

[5] Dr. Duplantis points out that "every simulation model will predict price increases as long as margins are positive and there is some diversion between the merging firms." Duplantis Affidavit, ¶ 105. Note that other factors such as marginal cost efficiencies can offset this upward price pressure.

byproduct of the data. If, hypothetically, the market shares of the merging Parties were lower, the price impact estimates would be lower.[6]

11. The economics literature widely recognizes that high market shares (and relatedly high diversion between the Parties) and margins are indicators of market power and the most important conditions that create incentives to increase prices post-merger.[7] Mergers between firms with high market shares magnifies their market power even more and can create strong incentives to increase prices. For example, the Merger Enforcement Guidelines recognize that market shares are informative of merger price effects: "…information about market share and concentration can inform the analysis of competitive effects when it reflects the market position of the merged firm relative to that of its rivals."[8] My analysis shows that, in many local markets, the market shares of the merging firms significantly exceed the 35-percent threshold level set in the Guidelines.[9]

12. To further demonstrate that high market shares and margins, not modeling assumptions, are the primary driver of the predicted price impact, I consider an alternative model in which suppliers set posted prices in each market. That is, suppliers can charge different prices to customers in different markets, but do not price discriminate between buyers within the same market. The pricing incentives that arise from a merger in this setting can be characterized by a measure of upward pricing pressure ("UPP") and its closely related statistic, the gross upward pricing pressure index ("GUPPI").[10]

13. UPP and GUPPI statistics quantify the intuition behind the most basic theory of consumer harm associated with horizontal mergers—the incentive for the merging parties to raise their prices. Both are tools discussed in the

[6] In particular, I predicted price effects after reducing the Secure and Tervita market shares by 50 percent in each market and re-apportioning that revenue to some other third-party competitor. The predicted price impacts are significantly lower when the Parties' shares are smaller, ranging from less than 1 percent to around 6 percent. See my workpapers.

[7] See, e.g., Shapiro, C., "Mergers with Differentiated Products," Antitrust, Spring 1996 ("The principle here is that high Gross Margins and high Diversion Ratios suggest large post-merger price increases.").

[8] Competition Bureau Canada, "Merger Enforcement Guidelines," October 6, 2011, ¶ 5.8.

[9] Competition Bureau Canada, "Merger Enforcement Guidelines," October 6, 2011, ¶ 5.9.

[10] Upward pricing pressure is closely related to merger simulation models. For example, Roy J. Epstein & Daniel L. Rubinfeld, "Understanding UPP," *The BE Journal of Theoretical Economics* 10(1), 2010.

academic literature and are often used in merger review to approximate the incentive for the merging parties to unilaterally raise price.[11]

14. Both UPP and GUPPI rest on two import factors that influence merging parties' pricing decisions:

- Diversion ratio from itself to its merging partner; and
- Markup of its merging partner.

15. Specifically, if two firms, i and j, were to merge, then the UPP of firm i is defined as follows:

$$UPP_i = Diversion\ ratio_{i \to j} \times Markup_j$$

16. GUPPI reports the upward pricing pressure as a percentage of the starting price and is defined as follows:

[11] Farrell, Joseph, and Carl Shapiro, "Antitrust Evaluation of Horizontal Mergers: An Economic Alternative to Market Definition," *The BE Journal of Theoretical Economics* 10(1), 2010, pp. 1–39 at p. 2 ("This approach, based directly on the underlying economics of pricing, asks whether the merger will generate net upward pricing pressure (UPP). This involves comparing two opposing forces: the loss of direct competition between the merging parties, which creates upward pricing pressure, and marginal-cost savings from the merger, which create (offsetting) downward pricing pressure."); Miller, Nathan H., and Marc Remer et al., "Upward pricing pressure as a predictor of merger price effects." *International Journal of Industrial Organization*, 52, 2017, pp. 216–247. Bailey. E. M., Leonard, G. K., Olley, G. S., Wu, L. Merger Screens: Market Share-Based Approaches versus "Upward Pricing Pressure," *The Antitrust Source*, February 2010. ("UPP is a measure of the strength of the merged firm's incentive to increase price above pre-merger level.") Miller, N.; Sheu, G., "Quantitative Methods for Evaluating the Unilateral Effects of Mergers," Georgetown University McDonough School of Business Research Paper Series, July 2020. ("The UPP framework allows for a micro-founded analysis of post-merger pricing incentives if reasonable estimates of diversion and markups can be obtained for the merging firms.") Moresi, S., "The Use of Upward Pricing Pressure Indices in Merger Analysis," *The Antitrust Source*, February 2010. In a workshop of International Competition Network Chief/Senior Economists Workshop held at University of British Columbia, Vancouver in 2016, a discussion of merger unilateral effects included the use of UPP and GUPPI (https://www.internationalcompetitionnetwork.org/wp-content/uploads/2018/10/AEWG_EconWorkshop2016Report.pdf). While Canada has used upward pricing pressure as a "screening" tool, UPP has an extensive role in U.S. antitrust, which includes citations by courts, e.g. *Cigna/Anthem*. See Government of Canada, "Competition Bureau statement regarding Evonik's proposed merger with PeroxyChem," January 28, 2020, available at https://www.competitionbureau.gc.ca/eic/site/cb-bc.nsf/eng/04519.html, ("The Bureau's analysis of likely competitive effects was also informed by upward pricing pressure and merger simulation analyses conducted by its economic expert.") (accessed on September 2, 2020); Memorandum Opinion, *United States of America, et al., v. Anthem, Inc., et al.*, United States District Court for the District Of Columbia, Case No. 1:16-cv-01493-ABJ, February 21, 2017, pp. 1-140 at pp. 58-59 ("Using an Upward Pricing Pressure (UPP) analysis, Dr. Dranove predicted static harm totaling $383.8 million. And when he performed the UPP analysis again, this time incorporating the fact that win/loss data suggests that Anthem and Cigna are close competitors, the exercise led to a total of $930.3 million in static harm in the relevant market.") As part of the investigation into the proposed Reynolds American/Lorillard (2015) merger, the FTC used UPP to predict price effects, prior to negotiating a divestiture. The analysis is described in Hanner, D., G. Z. Jin, M. Luppino, and T. Rosenbaum, "Economics at the FTC: Horizontal mergers and data security," *Review of Industrial Organization*, 2016, 49, 613–631.

$$GUPPI_i = \frac{UPP_i}{P_i}.$$

17. The incentive to raise prices is higher when more customers will be recaptured—when the diversion ratio is higher.[12] Alternatively, the opportunity cost of attracting customers with lower prices is higher when many of them will be taken from the other merging party. Thus, the UPP at one party is proportional to the diversion ratio from that party to the other. In this matter, data, documents, and market shares indicate that diversion ratios between Secure and Tervita facilities are likely high.[13]

18. The markup of the other merging party measures the marginal profit, or value, of recapturing an additional customer. The incentive to raise prices is higher when this value is higher. Alternatively, the opportunity cost of attracting customers with lower prices is higher when the ones coming from the other merging party were generating very high profits. Thus, the UPP at one party is proportional to the markup at the other party.

19. The academic literature has shown that this measure approximates the price impact of a merger in markets, including those that do not necessarily have perfect price discrimination.[14]

20. GUPPI-predicted price effects do not rely on the assumptions of the second score auction that Dr. Duplantis criticizes. In particular, they do not assume perfect price discrimination (i.e., suppliers to identify customers' facility valuations and set prices accordingly). For this merger, where we observe high margins and diversion ratios (e.g., as indicated by market shares),[15] GUPPI

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[12] In my Initial Affidavit, I described how over half of Secure's and Tervita's TRD and landfill customers in the transaction data have diversion ratios greater than [redacted] reaching as high as [redacted] and [redacted] percent for customers of Secure and Tervita TRDs, respectively. The weighted-average margins for TRDs are [redacted] percent on the lower end. See Miller Initial Affidavit, ¶ 110; Miller Initial Affidavit back-up materials.

[13] See Section 5.2.2. in Miller Initial Affidavit. In my Initial Affidavit, I estimated the diversion ratios using market shares. This approach is often used. Shapiro, C., "Mergers with Differentiated Products," Antitrust, Spring 1996. Dr. Duplantis does not dispute my estimate of diversion ratios or claim that diversion ratios are likely low. In fact, she seems to think that Secure will recapture most if not all of the customers from closed facilities, implying high diversion ratios ("SECURE's integration plan involves shifting volumes from closing facilities to remaining facilities… This means that most if not all of SECURE's profits will be recaptured.") Mr. Harington, in his analysis of transportation costs, assumed that all customers of closing facilities will be recaptured by the remaining Party facilities. See Affidavit of Andrew Harington, March 25, 2022 ("Harington Affidavit, March 25, 2022"), fn. 3.

[14] For example, Miller, N. H., M. Remer, C. Ryan, and G. Sheu, "Upward pricing pressure as a predictor of merger price effects." *International Journal of Industrial Organization*, 2017, 52, 216–247.

[15] Market shares are often used as proxies for diversion ratios. Miller, N.; Sheu, G., "Quantitative Methods for Evaluating the Unilateral Effects of Mergers," Georgetown University McDonough School of Business Research Paper Series, July 2020. ("…merger review often maintains the diversion-by-share assumption, at least as an analytical starting point.") Shapiro, C., "Mergers with Differentiated Products," Antitrust, Spring 1996. See the

would predict significant incentives to increase prices post-merger and hence large price effects. This discussion underscores that price effects I presented in my Initial Affidavit are driven by the market features as reflected in the data and are not dependent on particular modeling assumptions.[16]

21. Documents I reviewed (referenced in my Initial Affidavit) also indicate that the merger is likely to have significant price effects. Documents show that Secure and Tervita compete head-to-head in many markets and restrain each other's pricing. When competition between merging parties is stronger, the likelihood that the merger will result in large price effects is higher. For example, the Parties identify each other as their primary competitors in their Annual Information Forms,[17] internal analyses of competitive conditions identify each other as major competitors,[18] and documents show that they provide discounts to be competitive with each other's prices.[19] During Tervita's acquisition of Newalta, the parties identified Secure as their principal competitor and explained that its pricing was aggressive.[20]

22. It is also worth noting that Dr. Duplantis estimates positive price impact in many of the markets using her "natural experiment." In the markets that become a monopoly or go from three competitors to two because of the merger, she estimates a price impact of between 10 and 11 percent.[21] The magnitude of her price increases are typically considered non-negligible in merger review and

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Memorandum Opinion for H&R Block/TaxACT (2011) at page 76, or the demonstrative exhibit used by David Dranove during the Anthem/Cigna (2016) trial at page 48, available at https://www.justice.gov/atr/page/file/914606/download, for example.

[16] In fact, in my work, I showed that simulation results from a second-score auction and its logit Bertrand counterpart (which does not have the same assumptions as a second-score auction) are strongly positively correlated. Miller, N. and Gloria G. Sheu, "Quantitative Methods for Evaluating the Unilateral Effects of Mergers," *Review of Industrial Organization*, Vol. 58, No. 1, 143-177 (2021). Special Issue: "The 2010 Horizontal Merger Guidelines after Ten Years." ("It is interesting to compare and contrast the logit second-score auction simulation with its logit Bertrand counterpart…In order to investigate this issue, we generated a series of logit second-score auction simulations in the same manner as for the Bertrand simulations discussed in Section 2. The resulting effect on prices across the two models is strongly positively correlated, with, for example, a correlation coefficient of 0.96 for markets with four pre-merger firms.")

[17] Miller Initial Affidavit ¶¶ 92-93.

[18] Miller Initial Affidavit ¶¶ 94-96.

[19] Miller Initial Affidavit ¶ 97.

[20] Miller Initial Affidavit ¶¶ 98-99.

[21] Duplantis Affidavit, ¶ 79 ("I show that for my baseline specification prices increased on average as a result of the Tervita/Newalta transaction by up to 11.0% for "2-to-1" markets, up to 9.8% for "3-to-2" markets, and 0.9% for "4-to-3 or more" markets.").

the academic literature.[22] Furthermore, as I discuss below, there are reasons why her analysis may not capture the full impact of this merger.

3.2. The model and modeling inputs I use reasonably capture the salient features of this industry

23. Dr. Duplantis claims that some of the modeling assumptions underlying the price impact I have estimated are unrealistic and thus asserts that the price impacts and DWL due to facility closures are "unreliable" and "overestimated."[23] Among the modeling assumptions she criticizes are the extent to which the Parties are able to price discriminate among customers,[24] waste services facilities are differentiated,[25] oil and gas producers are able to negotiate prices across markets (or the extent to which there is buyer power),[26] and oil and gas producers can self-supply, creating a source of price discipline for the Parties' prices.[27] I disagree with Dr. Duplantis' assessment that the model I use is unreliable or yields inflated results simply because it does not precisely reflect all industry details or nuances.

24. Economic models, including merger simulation models, in general, are meant to capture the salient features of markets. As I explain in my 2020 paper "Quantitative Methods for Evaluating the Unilateral Effects of Mergers," they cannot be expected to capture all details and complexities of markets.[28] For example, when estimating the DWL from lower volumes that higher post-merger pricing will create, Dr. Duplantis uses a linear demand curve to model oil and gas producers' demand for waste services.[29] She does not claim or

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[22] See, e.g., Coloma, Germán. "The effect of the Repsol-YPF merger on the Argentine gasoline market." *Review of Industrial Organization* 21, no. 4 (2002): 399-418. While the Canadian Merger Enforcement Guidelines does not specify the numerical threshold for a "material price increases," it states that "[a] material price increase is distinct from (and will generally be less than) the 'significant and non-transitory price increase' that is used to define relevant markets," which is typically considered to be a 5-percent price increase over a one year period. See Canadian Merger Enforcement Guidelines, Section 2.14, fn. 14, Section 4.3.

[23] Duplantis Affidavit, Section IV.C; Section III.

[24] Duplantis Affidavit, Section III.A.2.

[25] Duplantis Affidavit, Section III.A.3.

[26] Duplantis Affidavit, ¶ 62.

[27] Duplantis Affidavit, Section III.A.3.

[28] Miller, N. and Gloria G. Sheu, "Quantitative Methods for Evaluating the Unilateral Effects of Mergers," *Review of Industrial Organization*, Vol. 58, No. 1, 143-177 (2021). Special Issue: "The 2010 Horizontal Merger Guidelines after Ten Years." ("Models by their nature are simplified representations of the world. Their purpose is to isolate the most important ways that mergers affect economic incentives, and they need not account for secondary and tertiary details… Furthermore, as parametric assumptions are necessary to make predictions, some uncertainty is inevitable. Thus, our view is that modeling should not be expected to provide precise estimates of merger effects, but rather should be used to assess countervailing forces and provide an overall sense of magnitudes.").

[29] Duplantis Affidavit, ¶ 152, fn. 185.

provide evidence that the demand is actually linear, but, rather, that it is an approximation.[30]

25. Simulation models indicate the strength of pricing incentives after the merger, but they cannot be interpreted as exact prediction tools for post-merger pricing. Instead, they aim to assess whether, and to what extent, the merged firm would have an incentive to raise prices after the merger, recognizing that large predicted price impacts can lead to some uncertainty about the precision of the estimated impact. The second-score auction model I used captures the observed features of this market. It indicates strong incentives to increase prices, is corroborated by a GUPPI-based approach, and is consistent with documents.

26. The following subsections describe the evidence supporting the assumptions intrinsic to the second-score modeling framework that I use to study the Parties' post-merger pricing incentives. In particular, I describe evidence of price discrimination, product differentiation, lack of price-discipline from buyer power or self-supply. I also discuss Dr. Duplantis' arguments about my margin estimates and why I reported price decreases in a few local markets.

3.2.1. *Price discrimination is common in the waste service industry*

27. Second-score auction models are often used in merger analysis where prices are negotiated individually.[31] Dr. Duplantis' own publication discusses its use in merger analysis. In a 2008 article, she explains the intuition of pricing reflected by the second-score auction and states "[t]his analysis translates directly into determining the effect of a merger on prices paid by customers in markets where prices are negotiated individually."[32] In fact, she specifically mentions

[30] Duplantis Affidavit, ¶ 152, fn. 185.

[31] In the U.S., auction merger simulations appeared in the trials for Sysco/US Foods (2015), Anthem/Cigna (2016), and Wilhelmsen/Drew Marine (2018). In these instances, the experts testifying for the FTC or the DOJ used a second-score auction framework. 8See the Sysco/US Foods Memorandum Opinion at pages 89-92, discussing testimony by Mark Israel on behalf of the FTC, the Anthem/Cigna district-level Memorandum Opinion at pages 58-59 and 66- 67, discussing testimony by David Dranove on behalf of the DOJ, and the Wilhelmsen/Drew Marine Memorandum Opinion at pages 44-45, discussing testimony by Aviv Nevo on behalf of the FTC. Also see Federal Trade Commission vs. Rag-Stiftung et al., Memorandum Opinion, Civil Action No. 19-2337, p. 58, available at https://ecf.dcd.uscourts.gov/cgi-bin/show_public_doc?2019cv2337-150.

[32] Khemani, Shyam, Frederick Warren-Boulton, Renee Duplantis, "From Structure to Effects: The Economics of Merger Control," The Handbook of Competition Economics, 2008, p. 21.

"geographic markets involving products with significant transportation costs" as an example where this model can be used.[33]

28. The second-score auction framework captures the fact that facilities and customers negotiate prices to handle waste services, and that there are considerations in the price negotiation specific to the well locations and types of waste the well will produce.[34] In this framework, suppliers charge customers different prices (i.e., price discriminates). The second-score model can assess how customers may experience differing levels of harm from the merger because of differential pricing.[35]

29. Dr. Duplantis criticizes the model by claiming that "perfect" price discrimination is "impractical" and "customers do not necessarily negotiate different prices for waste from each of their well locations."[36] However, even if suppliers do not charge every single well-location of every single customer a different price, there is strong and clear evidence that there is widespread price discrimination in this industry. My model captures this salient feature of the industry.

30. Tervita documents, Secure documents, and witness statements all indicate price discrimination in the industry. There are ample examples of customer- or well-level price negotiations in the record, which often include details about the delivered volumes, delivered waste composition, the delivery locations, and the prices charged to process and treat the delivered waste.[37] I provided extensive evidence in Section 3.4 of my Initial Affidavit confirming that price discrimination is a key feature in this industry. I explained that pricing varies across facilities and customers, depending on customer locations, proximity of competitor facilities, relative transportation costs, win/loss records, estimated competitor pricing, local market conditions, customer volume commitments to

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[33] Khemani, Shyam, Frederick Warren-Boulton, Renee Duplantis, "From Structure to Effects: The Economics of Merger Control," The Handbook of Competition Economics, 2008, p. 21.

[34] Miller Initial Affidavit, ¶¶ 123, 125.

[35] Miller Initial Affidavit, ¶ 70 ("This is because, with price discrimination, competitive effects of the merger may vary for different customers—i.e., the merging parties may raise prices to certain targeted customers but not to others, or raise prices to some customers by more than for others."). See also Khemani, Shyam, Frederick Warren-Boulton, Renee Duplantis, "From Structure to Effects: The Economics of Merger Control," The Handbook of Competition Economics, 2008, p. 21. See all the Canadian Merger Enforcement Guidelines, Section 8.3 ("When price discrimination is a feature of the relevant market, it may be possible for some but not all buyers to counter the effects of an exercise of market power. For example, a merged firm may be able to increase prices to buyers that do not have the option to vertically integrate their operations, while other buyers with this option may be able to resist such a price increase.").

[36] Duplantis Affidavit, ¶ 62.

[37] Miller Initial Affidavit, ¶ 125; Engel testimony, December 20, 2021, p. 48-50, questions 121-127.

specific facilities, relationships, and other factors.[38, 39] I have also confirmed from the Parties' transaction data that pricing varies across facilities and customers for the same service and substance types.[40]

31. Dr. Duplantis also points to master service agreements ("MSAs"), where customers may negotiate prices across facilities and services.[41] However, she does not show that the existence of such agreements reverse or significantly affect my results. To the extent MSAs affect prices, the effect would be to "smooth out" the price effects across markets. MSAs would not significantly reduce my overall estimates of price effects. Further, customers can negotiate prices different from those specified in MSAs.[42]

32. Dr. Duplantis also claims that the model I use is inconsistent with "SECURE's pricing philosophy."[43] She claims that Secure [redacted] [44] Dr. Duplantis' claim implies that Secure is not a profit maximizing firm. [redacted]

33. [redacted] This implication is at odds with fundamental theory of firm pricing behavior. The model I use, and its

[38] Miller Initial Affidavit, ¶¶ 34-41.

[39] Dr. Duplantis claims that waste service providers cannot observe how each customer values one facility relative to other options and therefore cannot price discriminate. However, there are repeat interactions and personal relationships between customer service representatives and field supervisors, suggesting that waste service facilities can understand the specific needs of its customers and the value they derive from features of different facilities. See SESL0032746.

[40] Miller Initial Affidavit, ¶ 36. See also Witness Statement of Chad Hayden, February 9, 2022, ¶ 11 ("However, tipping fees are generally determined by our clients' own negotiations with disposal site operators, and may differ significantly for each client at each potential disposal site.").

[41] Duplantis Affidavit, ¶ 65.

[42] Miller Initial Affidavit, ¶ 39. See also Affidavit of David Engel, March 25, 2022, Exhibit 37 [redacted]

[43] Duplantis Affidavit, ¶ 64.

[44] Duplantis Affidavit, ¶ 64.

predictions, are based on a profit-maximizing behavior of firms. Further, [redacted]

3.2.2. *Product differentiation in the waste service industry comprises more factors than distances between drilling locations and waste service facilities*

34. Dr. Duplantis suggests that there is little differentiation among waste service facilities, except their location. She comes back to her claim when she discusses the DWL from facility closure estimates. I will address the issue here and revisit it in my response to her arguments regarding my DWL estimate.

35. First, Dr. Duplantis does not seem to dispute that location (and transportation costs) are a source of differentiation between facilities.[46] But the record identifies other sources of differentiation that lead to customer or well-level pricing in the industry.[47] These include wait-times and "turnaround" times required to unload the waste at the waste service facility,[48] waste capacity constraints at the facility on particular days, and the types of wastes accepted by the facility.[49] Other factors that may result in product differentiation across facilities for specific customers include relationships between customer service

[45] Duplantis Affidavit, ¶ 64 [redacted]

[46] Dr. Duplantis seems to admit that available evidence supports transportation costs as a reason why customers would value facilities differently. Duplantis Affidavit, ¶ 119.

[47] Duplantis Affidavit, ¶ 132; Miller Initial Affidavit, Section 3.3-3.4.

[48] Longer wait and turnaround times will increase overall costs to customers and the resources the economy uses to waste management.

[49] Miller Initial Affidavit, ¶ 123. See also SESL0032746 [redacted] TEV00111509 [redacted] Witness Statement of Halo Exploration Ltd., February 24 2022 ¶ 10 11 ("However, some facilities may have lengthy wait times for dropping off loads of waste, such that it may be better value to truck the waste to a more distant facility when those wait times are taken into account."); Witness Statement of Nigel Wiebe, January 27 2022, ¶ 12 ("Availability and capacity at nearby disposal sites is also a factor impacting this choice. Sometimes landfills are full or closed, and this can require travelling further to access alternative landfills. Disposal wells can also be capacity constrained with lengthy wait times, particularly in periods with lots of drilling."); SES0081384 ("Below is a google map of [redacted] facility relative to Secure, including the Tervita facilities mentioned yesterday. Tulliby Lake is a flagship heavy oil facility with a class 2 landfill with full fluid and slurry disposal also. We're 40 mins further than Bonnyville but have an all-weather tipping pad to eliminates wait times and chain up fees. Our average truck in-out is under 30 mins incl. sign-in and tipping."); SES0045741 ("In recognizing that SECURE is not always the lowest-cost service provider, SECURE takes pride in offering industry-leading service and safety standards").

representatives and field supervisors, historical pricing for customers that drill many wells, service capacity to handle the several types of waste services rendered in order to dispose of the waste, and volume commitments, among others.[50]

36. High facility margins also indicate that facilities are differentiated from each other in the eyes of customers. If these customers were truly indifferent between facilities, then economic theory would dictate that facilities' prices would be close to the cost of supplying the services, i.e., the facilities would earn nearly zero margin on services. In contrast, if the facilities are differentiated, then each facility has some form of market power over customers that prefer it over other options. Then each facility can charge higher prices to these particular customers, above the costs to provide the services, leading to higher margins.[51] Facility margins in the industry are positive and high.[52]

37. Dr. Duplantis claims that because customers use multiple facilities, including both Secure and Tervita facilities, it must be that they do not view facilities differently.[53] However, her analysis is at the parent customer level. Larger oil and gas producers have many well locations in different geographies and these well locations may have different preferences. In one particular local market, a customer may prefer a Secure facility (e.g., due to proximity, lower wait-times and other factors) while the same customer may prefer a Tervita facility in another local market to deliver its wastes from its wells in that market. In fact, transaction data shows that well locations most often send

[50] Miller Initial Affidavit, ¶ 33, 125. See also the Secure "SWOT Identification and Discussion," SESL0026672.pptx; Witness Statement of Halo Exploration Ltd., February 24 2022, ¶¶ 11, 12 ("There are other factors that can influence the choice of disposal site as well, including perks (such as meals) for drivers dropping off waste, and how the facility evaluates our products … In my experience, there can be disagreement about whether a load of oil cuts clean, and some waste disposal operators may be more likely to require further treating or processing of the oil. How a company has handled these disagreements over testing is an aspect of service that Halo considers when choosing a disposal site."); Witness Statement of DEL Canada GP Ltd., February 18 2022, ¶¶ 8-9 ("In general, DEL Canada has used Tervita's facilities because of the proximity to its assets and the relationship it had build with that company… In choosing a disposal and/or treating facility, DEL Canada typically considers the following non-exhaustive criteria, including proximity between the facility and DEL Canada assets: pricing, and quality of service.").

[51] Hal Varian, Intermediate Microeconomics, A Modern Approach, Seventh Edition, "25.7 Monopolistic Competition," at p. 461 ("If a firm is making a profit selling a product in an industry, and other firms are not allowed to perfectly reproduce that product, they still may find it profitable to enter that industry and produce a similar but distinctive product. Economists refer to this phenomenon as product differentiation-each firm attempts to differentiate its product from the other firms in the industry. The more successful it is at differentiating its product from other firms selling similar products, the more monopoly power it has-that is, the less elastic is the demand curve for the product. For example, consider the soft drink industry. In this industry there are a number of firms producing similar, but not identical products. Each product has its following of consumers, and so has some degree of market power.").

[52] See Miller Initial Affidavit Section 7.2. As I show below, margins remain high even if I consider additional variable costs Mr. Harington claims.

[53] Duplantis Affidavit 65 and Figures 10, 11, 12.

waste to only one facility, and that when they do send waste to more than one facility, the same owner most often operates the facilities.[54] This observation suggests the existence of facility- and well-specific factors leading a producer to choose a particular facility.

3.2.3. *Buyer power and self-supply are unlikely to discipline the Parties' prices*

38. Dr. Duplantis also suggests that buyer power and self-supply will constrain the Parties' post-merger pricing. She does not provide any direct quantification of the impact buyer power or self-supply.

39. Dr. Duplantis claims that Secure and Tervita have large customers. According to Dr. Duplantis "the [redacted] customers of SECURE and Tervita in 2019 accounted for [redacted]% of total revenue for SECURE and [redacted]% for Tervita."[55] These statistics in fact show that Secure and Tervita revenues do not critically depend on any one customer. On average, each of the largest [redacted] customers account for less than [redacted]% of Secure's revenues and just over [redacted]% of Tervita's revenues. Secure's largest customer, [redacted] accounts for only [redacted]% of revenues. Tervita's largest customers, [redacted] and [redacted] account for [redacted]% of revenues each.[56] In fact, [redacted] statement shows that one of the largest customers does not have buyer power against Secure. Similarly, [redacted][58]

40. Dr. Duplantis also claims that customers negotiate prices across facilities and services and implies that customers can use this to push back against prices. For example, she claims that customers can leverage their volume of waste water, [redacted][59]

[54] See my workpapers.

[55] Duplantis Affidavit, ¶ 68.

[56] Duplantis Affidavit, Figures 10 and 11.

[57] [redacted]

[58] [redacted]

[59] Duplantis Affidavit, ¶ 70.

However, after the merger, the "more robust" competition in waste water disposal services will decrease significantly. As I showed in my Initial Affidavit, Secure and Tervita will have 78 percent market share when they face one other third-party competitor and 63 percent market share when they face two third-party competitors.[60]

41. Dr. Duplantis also claims that customers can prevent price increases through increased self-supply. For the amount of self-supply to increase, customers would have to build new facilities or increase the use of existing facilities that they currently own and operate. Both of these options seem limited. There is limited self-supply in TRDs and landfills.[61] Dr. Duplantis' maps show no first-party owned TRDs and only two landfills.[62] There are numerous water disposal wells owned by oil and gas producers. Oil and gas producers are already using a combination of self-supply and third-party facilities that reflect their profit-maximizing incentives based on costs and benefits of utilizing each type of facility. Further, existing self-supply wells are typically not able to handle the large amount of waste water that come from drilling a new well or fracking an existing well, and the third-party waste service providers are needed to handle the overflow.[63]

42. Building new facilities to expand self-supply is also not a likely option to counteract post-merger price increases.[64] It would take significant time and cost to construct a new water disposal well, landfill, or TRD facility.[65] Witnesses

[60] Miller Initial Affidavit, Exhibit 9.

[61] Miller Initial Affidavit, fn. 116. In my Initial Affidavit, I acknowledge that, according to a witness statement from Murphy Oil, producers have some capacity to handle emulsion processes on site, but these processes are not sufficient to handle other TRD waste services such as process sludges or tank bottoms. See Miller Initial Affidavit, fn. 116; Witness Statement of Jared Anstett (Murphy Oil), February 22, 2022, ¶¶ 11, 13 ("The majority of Murphy's production streams containing emulsions of oil and water are pipeline connected to in-field custom treating facilities, where the emulsion is separated into its oil and water components.... Only direct wellhead production uncontaminated by other waste streams can be treated at the in-field custom treating facilities described above. If there is any amount of oilfield waste generated, such as a sludge containing solid waste, the stream must be sent to treatment facilities such as Secure's Full Service Terminals ('FSTs').").

[62] Duplantis Affidavit, Figures 22-24.

[63] Miller Initial Affidavit, ¶ 66. See also Secure, "[redacted]". See also Witness Statement of Petronas Energy Canada LTD., Carl Lammens, February 3, 2022, ¶ 25; Witness Statement of Crew Energy Inc., James Taylor, February 14, 2022, ¶¶ 13-18; Witness Statement of Cliff Swadling, Obsidian Energy LTD., February 21, 2022, ¶ 25.

[64] [redacted]

[65] [redacted]

testified that the time to build a landfill can range from 1.5 to 4 years, including the time to meet provincial permitting requirements.[66] Secure's Mr. Engel confirmed that estimates of around $[redacted] million initially to build a TRD and $[redacted] million to build a landfill are reasonable estimates.[67] Many oil and gas producers confirmed that they do not produce enough waste of their own to justify the costs,[68] and the permitting processes required to dispose of other oil and gas producer waste are extensive.[69] Further, oil and gas producers in certain regions of the WCSB do not have opportunities to drill water disposal wells and self-supply due to geological factors.[70] Even if an oil and gas producer acquires a new facility to use for self-supply, it may not significantly impact Secure's pricing for the waste the customer continues to deliver to the

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[redacted] I am not aware of any full service TRDs owned by oil and gas producers. However, testimony from Murphy Oil suggests that they have the capacity to handle their emulsion process, but they are unable to process other TRD-specific wastes such as sludges and tank bottoms. For the latter, Murphy Oil requires services from third-party waste service providers such as Tervita and Secure. Witness Statement of Jared Anstett (Murphy Oil) (Murphy Oil Company Ltd.), February 21, 2022, ¶¶ 11-15. See also Witness Statement of Tinu Odeyemi, January 8, 2022 at Exhibit B.

[66] Witness Statement of David Hart (Canadian Natural Resources Limited), February 22, 2022, ¶ 25 ("The timeline to build a landfill (including obtaining all necessary regulatory approvals) can typically range from eighteen months (best case scenario) to four years from the initial decision to build. I am advised by my team that the cost can exceed [redacted]"); Witness Statement of Jared Anstett (Murphy Oil), February 22 2022, ¶ 31("Murphy has considered constructing a storage pond in Alberta [...] we expect that the regulatory process in Alberta would take longer than in BC.").

[67] Engel testimony, December 21, 2021, questions 727-730, 756; TEV00060015. Other evidence confirms that the costs to construct disposal wells are closer to the $[redacted] dollar range, depending. See Affidavit of Keith Blundell, March 25, 2022, ¶¶ 74, 115.

[68] See, e.g., Witness Statement of Petronas Energy Canada LTD., Carl Lammens, February 3, 2022, ¶¶ 58-59 ("While the ability to dispose of solid oilfield waste is an essential service for PECL, the company does not produce sufficient volumes of internally produced solid oilfield waste to justify establishing its own licensed landfill facility. In addition to possessing insufficient volumes, PECL does not regard solid waste disposal as part of its' core business.").

[69] Miller Initial Affidavit, ¶ 20. See also Witness Statement of Paul Dziuba (Chevron Canada Resources), February 24, 2022, ¶ 25 ("Currently, Chevron does not operate any of its own TRDs or landfills. Chevron's primary business is oil and gas exploration and it does not have plans to build any such facilities. There are many factors that make it difficult to internalize this type of business. For example, receiving the necessary permits to begin creation of a landfill can take between 24-36 months, even just finding a geologically suitable location can be very difficult, and initial estimates of the capital expenditures required to build a TRD/FST or landfill indicate it would not be economically feasible.").

[70] Secure, Project Name: Pipestone SWD, April 4, 2019, SES0041155, p. 3 ("Due to the limited disposal geology in the area producers have not been pursuing inhouse disposal options."); Witness Statement of Crew Energy Inc., James Taylor, February 14, 2022, ¶ 17 ("To begin the process of building a disposal well, Crew Energy evaluates subsurface geological targets for potential disposal zones. In depth geophysical, geological and engineering analyses occur to identify the geological horizon and the location of the well. Further, a drilling permit is acquired and then, a well is drilled, completed or converted to disposal services."); Engel testimony, December 22, 2021, questions 1509-1510 ("Q. Underneath the heading it says: 'There are limited areas within Alberta with the appropriate geology to construct disposal wells.' Mr. Engel, that was correct when Secure made its submissions on May 17, 2018. Correct? A. Yes. Q. You would agree with me that is still accurate today? A. Yes."); Secure's submission to the Competition Bureau Re: Proposed Transaction between Tervita and Newalta, May 17, 2018 [RBBA00011_000000002], p. 24 ("There are limited areas within Alberta with the appropriate geology to construct disposal wells"). See also Tervita, "Energy Services, Facility Sales Plans Q3 2020: Action Plan Summary," July 15, 2020, TEV00247518.docx.

third-party facility. CNRL's David Hart explained that it acquired the Manatokan landfill. However, this acquisition (an increase in their ability to self-supply) did not lead to a reduction in the rate CNRL pays at the Party's close-by Bonnyville landfill.[71]

43. It should also be noted that building new self-supply facilities would require fixed investments and, therefore, could at least partially undo the "efficiencies" from facility closures that Secure claims would benefit the Canadian economy.

44. In addition, first-party operated and self-supply facilities are not typically able to accept waste from other oil and gas operators. Rather, these facilities are purely used to dispose of waste from oil and gas wells owned by the first-party producer,[72] and in instances when a well can take in other oil and gas producers' wastes, the volumes are often small compared to the Parties' waste volumes.[73] Therefore, self-supply facilities owned by an oil and gas producer cannot act as a constraint on prices charged to another oil and gas producer with limited or no such capability. Further, given that the transportation costs in the industry are significant, customers would have to increase self-supply in every location where they have oil and gas wells. A customer's additional self-supply water disposal well for its operations near Calgary would not likely have an impact on the disposal options that customer has for the waste water it needs to dispose from its operations near Edmonton.

45. Regardless, I accounted for the possibility of self-supply in my empirical analyses. First, my market share, diversion, price effects, and share-based DWL analyses all account for existing first-party water disposal and landfill facilities that can take in waste from other oil and gas producers (i.e., they are included as facilities available to customers in local markets).[74] Second, my analyses

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[71] Witness Statement of David Hart, April 7, 2022, ¶ 16. According to Google maps, the two landfills are about 88 km or 1.1 hours driving distance apart (no traffic).

[72] Miller Initial Affidavit, ¶¶ 64, 67. See also Letter from Brian A. Facey (Blakes) to Commissioner Matthew Boswell (Competition Bureau of Canada), "SECURE Energy Services Inc.'s acquisition of Tervita Corporation," March 12, 2021 [RBBB00001_000000002], p. 13 ("…producers such as CNRL, Cenovus/Husky, Shell and ConocoPhillips operate landfills for their own exclusive use…"). See also Alberta Energy Regulator, "Approved Oilfield Waste Management Facilities," available at http://www1.aer.ca/ProductCatalogue/41.html; Witness Statement of David Hart (Canadian Natural Resources Limited), February 22 at Exhibit H(07) (RCAC00002_000000010) [redacted]

[73] Miller Initial Affidavit, ¶¶ 67-68.

[74] Miller Initial Affidavit, ¶¶ 64, 69, 127, 156. I account for the fact that around 10 percent of revenue generated in any customer-defined market comes from facilities or alternatives that are outside of the defined market, or are not among the facilities that comprise the overlapping draw area defining the boundaries of each customer-

account for options outside of the relevant markets, which can include self-supply in addition sending waste to other third-party facilities outside the local geographic area, to other first-party facilities, or bio-remediating.[75]

3.2.4. *Even if I take into account additional costs claimed by Mr. Harington, my findings do not change*

46. Dr. Duplantis, relying on Mr. Harington, challenges my estimates of variable cost margins and claims that margins must cover "lifetime" capital costs.[76] Let me first clarify that economic theory underlying merger simulation models explains that firms consider marginal costs in pricing decisions.[77] Therefore, the margins used in my simulation model correctly do not consider any "lifetime" costs, which are mostly sunk costs as Mr. Harington explains.[78] In her 2008 paper, Dr. Duplantis discusses a merger simulation her firm used in a market where prices are product or customer specific, where the model used marginal costs.[79]

47. Mr. Harington describes three broad cost categories "that are relevant when assessing the 'lifetime' profitability of a facility," and states that only some of these could be classified as variable costs.[80] These include upfront and periodic capital costs. As Mr. Harington explains, most of these costs (e.g., upfront cost of building a facility) are sunk and, therefore, I do not include them in my margin calculations. The exception is "depletion" costs, which Mr. Harington claims could be classified as variable cost. He points to the "depletion" line items in facility financials. He gives the example of constructing new cells and

defined market. This assumption applies to the market concentration analyses in Exhibit 9, diversion ratio analyses in Exhibits 12 to 17, price effects analysis in Exhibit 21, and the DWL analysis using the market-share approach in Exhibit 24.

[75] Miller Initial Affidavit, ¶ 86.

[76] Duplantis Affidavit, ¶ 61.

[77] Miller, N.; Sheu, G., "Quantitative Methods for Evaluating the Unilateral Effects of Mergers," Georgetown University McDonough School of Business Research Paper Series, July 2020.

[78] Harington Affidavit, ¶ 257.

[79] Khemani, Shyam, Frederick Warren-Boulton, Renee Duplantis, "From Structure to Effects: The Economics of Merger Control," The Handbook of Competition Economics, 2008, p. 21. Under the section where she discusses "Estimating the effects of mergers in markets where prices are product and customer specific," she explains that "MiCRA estimated delivered prices for a number of products of each of the merging parties at approximately 150 locations, as a function of marginal costs and distances to the closest, second-closest and third closest competitors."

[80] Harington Affidavit, March 25, 2022, ¶ 253.

capping full cells at a landfill every few years. He argues that these costs depend on the volume, and thus they would likely be variable costs.[81]

48. Mr. Harington's claim that depletion costs "would likely be" variable costs is inconsistent with his own definition of variable costs in his initial affidavit. There, he wrote that "Variable costs are considered to be short term incremental costs incurred directly on account of a ±5% change in output …"[82] Costs of constructing new cells or capping full cells do not incrementally change on account of a ±5% change in output. One document from the record described the life of a new proposed cell as [redacted] suggesting that these costs are less firmly tethered to volume on an annual basis.[83] Regardless, to show that my results do not change significantly, I include depletion costs from facility financials in my calculation of margins in this report.[84]

49. Mr. Harington also points out that facilities incur costs at the end of their life for remediation (and accrue them as part of "asset retirement obligations"). He admits that these obligations accrued so far are sunk costs but claims that the incremental increase in remediation costs as a facility incurs additional waste are variable costs. He does not point to a specific line item or a method to calculate these costs. Similar to depletion costs, these remediation costs also do not fit in with Mr. Harington's definition of variable costs. The incremental 5% waste a facility takes in likely will not significantly impact the cost of remediating the whole facility at eventual shut down. Regardless, to show that my results do not change significantly, I include an estimate of the variable part of asset retirement obligations in my calculation of margins in this report.

50. I also note that when Secure and Tervita close facilities, these variable depletion and remediation costs are not savings to the Canadian economy. If the customers of the closing facilities take their waste to remaining Secure facilities, Secure will still incur these costs at those facilities absorbing the waste from the closed facilities.

51. Regardless, I incorporated annual depletion costs and incremental asset retirement costs into my margin calculations. The facility-level margins are

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[81] Harington Affidavit, ¶ 257.

[82] Harington Initial Affidavit, Exhibit C (Efficiencies Report dated June 3, 2021, ¶ 17), [RCFD00001_000000014].

[83] TER_00003190.

[84] See Section 6.1.

reported in Section 6.1,[85] and I find that the changes in them are not large.[86] Additionally, I calculate the implied predicted price impact, which is reported in **Exhibit 1**.[87] Compared to the results of Exhibit 21 from my Initial Affidavit, the largest changes in predicted price impacts are to landfill markets, which is consistent with landfills having larger depletion and estimated annual ARO costs.[88] Nonetheless, the predicted price effects are still large in all three product markets.

EXHIBIT 1
Merger simulation predicted price increase estimates accounting for depletion and estimates of annualized ARO

	TRD	Landfill	Water Well
2-to-1	50.5%	-	23.9%
3-to-2	23.9%	8.9%	22.0%
4-to-3 (or higher)	14.9%	8.9%	10.3%
Total weighted average	*24.3%*	*8.9%*	*11.1%*

Source: Tervita Transaction Data; Secure Transaction data; Secure Facilities Data (4 210422 - Revenues and Volumes.xlsx): RBEJ00002_000000306; Tervita Facilities Data (PROTECTED & CONFIDENTIAL Facility List - FINAL – 05282021.xlsx: RBEK00004_000000068; Appendix to Miller Initial Affidavit (Section 7.7)

Note: Simulation assumes that Parties complete planned closures. Each predicted percentage price increase is based on the revenue-weighted average across each of the Parties' geographic markets. To calculated the percentage change in prices, or the percentage change in markups, the post-merger implied markups are compared to the pre-merger implied markups. Markets in which either Secure or Tervita do not generate at least 5 percent of revenue are excluded from the percentage changes in markups because these markets appear to have less direct competition between the Parties and may not experience a change in competitive conditions due to the merger. Markets comprised only of a Secure or Tervita draw area are also excluded because these markets are already monopolies and may not experience and change in competitive conditions due to the merger. See the Appendix (Section (7.6) for more details.

3.3. Dr. Duplantis' "natural experiment" is not an appropriate indicator for price effects of this merger

52. Dr. Duplantis puts forward a price-effects model based on the idea of comparing the average waste service prices pre- and post-Tervita-Newalta merger. [89] She estimates smaller price effects (for example, around 10 percent in the markets she describes as merger-to-monopoly) and claims that findings of the model are indicative of the effects of the Secure and Tervita transaction.[90]

[85] See Section 6.1 for the calculation of these costs.

[86] My estimates of variable cost margins were reported in Exhibit 43 of Miller Initial Affidavit.

[87] I re-calculated the DWL, as well, and the results are reported in Section 4.2.

[88] See my backup materials.

[89] Duplantis Affidavit, ¶ 78.

[90] Duplantis Affidavit, ¶ 79 ("I show that for my baseline specification prices increased on average as a result of the Tervita/Newalta transaction by up to 11.0% for '2-to-1' markets, up to 9.8% for '3-to-2' markets, and 0.9% for '4-to-3 or more' markets."). Duplantis Affidavit, ¶¶ 79, 81.

53. However, using a natural experiment based on the past merger between Tervita and Newalta in order to study the potential price impacts resulting from this merger is not appropriate because the market structure was significantly different at the time of the Tervita's acquisition of Newalta. Most importantly, the market included another prominent competitor, Secure. Tervita argued at the time, "Secure is one of the most prominent remaining competitors… Both parties [Tervita and Newalta] identify Secure as their principal third-party competitor, suggesting that they lose business more often to Secure than to each other. From Tervita's perspective, Secure is viewed as the stronger competitor… [whereas] in Tervita's view Newalta is not a vigorous and effective competitor."[91] Further, Dr. Duplantis' natural experiment suffers has from several methodological flaws. As a result, her estimates are unreliable because of likely bias from these flaws.

3.3.1. *Dr. Duplantis' natural experiment cannot be used to assess the price impact of the current merger*

54. The Tervita-Newalta merger took place in a different market structure and at a time where the merged entity still faced competition from then second-largest competitor—Secure. Tervita and Newalta argued that the merger would not have price effects because of competition from Secure.[92] The Parties in this transaction, however, are the two remaining largest waste service providers in the WCSB, and many witness statements attest to primarily using the Parties' facilities over other third-party waste service providers and municipal landfills, among other potential options.[93] After the merger, the next largest TRD competitor, for example, will be Wolverine, which currently operates five TRD facilities compared to the 50 or more TRD facilities operated by the Parties.[94] Dr. Duplantis does not claim that the remaining competitors will be able to impose pricing discipline on the merged firm.

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[91] RBBA00008.

[92] Letter from Kevin Ackhurst (Norton Rose Fulbright) to Commissioner John Pecman (Competition Bureau of Canada), March 1, 2018 [RBBA00008_000000023], p. 22. See also Miller Initial Affidavit, ¶¶ 98-99.

[93] Miller Initial Affidavit, Section 4.1.2. See, e.g., Witness Statement of Petronas Energy Canada LTD., Carl Lammens, February 3, 2022, ¶ 36 ("Municipal landfills are not an option for PECL as they are neither licensed for nor designed to accept the type of solid oilfield waste which PECL generates."); Witness Statement of RemedX Remediation Services Inc., Barrie Flood, February 7, 2022, ¶ 13 ("Municipal landfills near the Breton Facility will, at times, accept industrial waste. While municipal landfills sometimes have lower waste disposal costs, in general these municipal landfills cannot accept all of the waste types that can be disposed of at a Class II landfill and there may be greater environmental risk in disposal at a municipal landfill. In RemedX's experience, Class II industrial landfills are generally constructed and regulated to a higher standard.").

[94] There are 17 Secure FSTs and 40 Tervita TRDs in my analysis before any merger-specific closures occur.

55. Dr. Duplantis' natural experiment assumes that price impacts in 2-to-1 markets, for example, from Tervita-Newalta merger would be similar to the price impacts from a Secure-Tervita transaction. However, this misses the broader price discipline imposed by having another large competitor present in the market, even if that competitor is not geographically proximate to drilling sites part of a specific customer-defined draw area.[95]

56. First, Dr. Duplantis analyzes markets where the Tervita-Newalta merger did not increase concentration by as much as this merger has. It is informative to compare the level of market concentration in the markets Dr. Duplantis includes in her analysis of the Tervita-Newalta merger to the markets in the current transaction. The estimated market shares of the merged entity are much lower (averages for each product market are around 25 to 30 percentage points lower) in the Tervita-Newalta merger than in the current transaction. For example, in the TRD markets she analyzes, the total market share of Tervita and Newalta combined is [redacted] percent.[96] In the current transaction, the total market share of Secure and Tervita TRDs is 80.5 percent.[97] Similarly, for landfills, the comparison is [redacted] percent to 74.8 percent, and for water disposal wells [redacted] percent to 64.4 percent. The waste service markets during the Tervita-Newalta merger are not necessarily comparable to the current market setting and, consequently, Dr. Duplantis cannot confidently use her event study to infer the price impact of the merger in the current matter.

57. Second, Secure's presence as a remaining competitor in the Tervita-Newalta merger may have created a constraint on pricing that is not present in the current merger. Dr. Duplantis acknowledges that the presence of Secure during the Tervita-Newalta merger makes the past setting and transaction different than the present one combining Tervita and Secure.[98] However, she claims that she is able to control for it by limiting her analyses to local markets where Secure was not present, or took in less than 25 percent of revenue.[99] However, her claim contradicts other arguments she makes in her affidavit. In particular, she argues that prices in a local market are impacted by the overall interactions

[95] The fact that the presence of a large competitor outside of the market may attenuate the anticompetitive impact of a merger is not inconsistent in markets with price discrimination. See, e.g., Lewis, Matthew S., and Kevin E. Pflum. "Diagnosing hospital system bargaining power in managed care networks." *American Economic Journal: Economic Policy* 7, no. 1 (2015): 243-74.

[96] Duplantis Affidavit, Figure 28.

[97] Miller Initial Affidavit, Exhibit 9.

[98] Duplantis Affidavit, ¶ 90 ("One distinction between the present Transaction and the Tervita/Newalta merger is the remaining presence of SECURE as a competitor to Tervita following its acquisition of Newalta.").

[99] Duplantis Affidavit, ¶ 100, fn. 120.

between the oil and gas producers and waste management companies. She claims that [redacted][100] She also claims that customers can leverage higher level of competition in water disposal market to negotiate "across a range of services and locations."[101] If her claims are true, then the presence of Secure could have disciplined prices regardless of whether a Secure facility was present in the markets Dr. Duplantis analyzes—customers could have leveraged Secure facilities in other markets or negotiations to handle other waste service products at lower prices.

58. By the same token, if customers and waste service providers do widely negotiate across products and geographic markets, as Dr. Duplantis claims, the "control" markets in her analysis, i.e., markets where Dr. Duplantis assumes that the merger did not have an impact on prices, could have also experienced price increases. Dr. Duplantis uses markets where Tervita and Newalta did not both have facilities as control markets; for example, as a control for a 2-to-1 market, she uses a market comprised of two competing facilities that excludes either Tervita, Newalta, or both.[102] She claims that because the number of independent facilities did not change in these markets, the merger should not impact the prices. However, this logic contradicts her claim that there is widespread cross-market and cross-product negotiation. With cross-market and cross-product negotiation, Tervita and Newalta could have imposed price increases in these control markets, as well.

59. Further, Dr. Duplantis does not really analyze markets where there were no nearby Secure facilities. Her analysis includes cases where "SECURE was a competitive option for at most 25% of a customer's waste purchases."[103] This is unlikely to eliminate Secure's disciplining effect on Tervita and Newalta prices. Customers in those markets could still use Secure against Tervita and Newalta in price negotiations for waste services. These customers would not have a large volume with Secure (and thus they are included in Dr. Duplantis' analysis), but would still use Secure to prevent price increases from Tervita and Newalta.

[100] Duplantis Affidavit, ¶ 65.
[101] Duplantis Affidavit, ¶ 70.
[102] Duplantis Affidavit, ¶ 175.
[103] Duplantis Affidavit, ¶ 100, fn. 120.

3.3.2. *Several weaknesses in Dr. Duplantis' natural experiment analysis calls into question the reliability of her results*

60. Dr. Duplantis' "natural experiment" is based on a difference-in-differences framework that compares average waste service prices changes paid by customers in treatment markets (i.e. markets affected by the Tervita-Newalta merger) to the price changes for customers that are in control markets (i.e., markets not affected by Tervita-Newalta merger). Her analysis, however, suffers from several methodological issues, rendering her analysis of the price impact from the Tervita-Newalta merger unreliable.

61. First, the logic behind comparing how price changes in the treatment group to the price changes in the control group is that such analysis allows one to parse out the price change that are unrelated to the merger but affects both groups. For example, if prices have generally been rising over time due to an increase in operation costs across all facilities, then the control group will exhibit such price change. A difference-in-difference approach differences out or removes such price change since it is unrelated to the merger. Hence, results from a difference-in-differences model rests on several assumptions related to the control group. One such assumption is that the control groups satisfy "common trends,"[104] which is to say that, absent the merger, the average waste service prices in both the treatment and control groups would have changed by around the same amount between 2017/2018 and 2019/2020. Typically, a difference-in-difference model is accompanied by evidence that the data for the control and treatment groups follow a common trend before the event took place, i.e. before the Tervita-Newalta merger.[105] While Dr. Duplantis has transaction-level data relevant to the pre-merger period, she did not provide evidence that prices in her treatment and control groups exhibited comparable pricing trends leading up to March 2018, when the merger was announced.[106]

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[104] Angrist, Joshua and Jorn-Steffen Pisckke, *Mostly Harmless Economics: An Empiricists' Companion*, pp. 230-231.

[105] Angrist, Joshua and Jorn-Steffen Pisckke, *Mostly Harmless Economics: An Empiricists' Companion*, pp. 231-233. Another option that researchers use to support the designed treatment and control groups when a time series of data is not available prior to the event involves demonstrating that the observable characteristics of the treated and control groups are similar to each other but for the treatment status. For example, Drs. Card and Krueger studies minimum wage effects using a natural experiment and demonstrated that basic fast-food employment characteristics before and after the minimum wage law changed was similar. See Card, David, and Alan B. Krueger. "Minimum wages and employment: a case study of the fast-food industry in New Jersey and Pennsylvania: reply." American Economic Review 90, no. 5 (2000): 1397-1420. Dr. Duplantis does not conduct this check either.

[106] Duplantis Affidavit, ¶ 88.

62. Second, Dr. Duplantis' post-merger period includes the eight months right after the Bureau closed its investigation of the merger, ending in March 2020 at the start of the major response to the COVID pandemic.[107] The merged entity may not have implemented price increases while the transaction was being actively investigated (presumably this is why Dr. Duplantis excluded the period of investigation from her analysis).[108] Prices immediately after the investigation may not fully reflect the effect of the merger either, due to ongoing negotiations, existing contracts, etc.[109] For example, [redacted][110] To the extent that there are contracts in effect or customers are able to obtain such temporary extensions, Dr. Duplantis' analysis would understate the effects of the merger because her data incorporate transactions for which prices had not yet risen. In short, there may be too little post-merger, pre-pandemic data to obtain a reliable estimate of the merger price effect.

63. Third, Dr. Duplantis' natural experiment, as applied to the landfills, relies on a small sample of customers. The total Tervita and Newalta revenue considered for this analysis is [redacted][111] In contrast, I analyzed revenues of $[redacted] from Secure and Tervita.[112] Dr. Duplantis' small sample could lead to noisy and imprecisely measured estimates. I am reluctant to make

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[107] Duplantis Affidavit, ¶ 94, fn. 116 ("I end the post period through March 2020 as there is a large decrease in sales beginning in April 2020 following the onset of COVID restrictions, which could potentially bias the analysis if prices were affected in any way from the reduced volumes.").

[108] Duplantis Affidavit, ¶ 94, ("The post period chosen consists of August 2019 through March 2020 to cover the time period after the Bureau's investigation of the transaction had been concluded up to the beginning of the COVID time period.").

[109] Erdős, Katalin, Roland Baczur, Dániel Kehl, and Richárd Farkas. "When post-merger price effect becomes smoothed over time: A case of a gasoline market merger." *Energy Economics* 105 (2022): 105682, p. 1 ("This paper provides empirical evidence using a difference-in-difference estimation strategy for the post-merger price effect caused by the acquisition of two branded chains for gasoline retail. On the one hand, mark-ups of the Hungarian retail gasoline market increased significantly after the takeover contract came into force. On the other hand, an additional price increase occurred after all of the acquired stations had offered the same services as the acquiring firm, even though implementing these changes might require a year after the takeover contract came into force. This suggests that further price effects may occur when the merger procedure requires a longer period").

[110] [redacted]

[111] Duplantis Affidavit, Figure 28. Note that the sample she used to estimate her natural experiment model likely included even less revenue generated at landfills because of the market definition she used to identify the sets of relevant customers. I also understand that Figure 28 summarizes revenue from relevant markets including Secure as a potential competitor, regardless of how much revenue Secure earns in each market. Dr. Duplantis omits from her natural experiment any markets in which Secure earns more than 25 percent of revenue. See backup for Duplantis Affidavit.

[112] Miller Initial Affidavit, Exhibit 9.

inferences from such a small sample. It is also disconcerting that Dr. Duplantis' robustness checks to her model produce predicted price impacts that not well-aligned with the ones she put forward – they show a wide range of positive and negative effects, some that are statistically different than zero, while others that are not.[113]

64. Fourth, Dr. Duplantis aggregates the transaction data and conducts her analysis at the customer level, rather than the well location level. This assumption creates issues both in the way she categorizes market structure (2-1, 3-2, etc.) and the way she measures price. Due to this aggregation, Dr. Duplantis' approach to constructing groups of markets (2-1 markets, 3-2 markets, etc.) does not accurately account for the competitive conditions at specific well locations. For example, some well locations for which the Tervita-Newalta transaction is a 3-to-2 merger are placed in 2-to-1 markets. The prices she measures are subject to a similar measurement error. This makes it difficult to interpret the predicted price impacts that Dr. Duplantis puts forward based on her natural experiment.

65. To understand her aggregation and its potential impact on her market structure categorization,[114] consider a scenario where a single customer produces waste from two well locations that are close to a single Tervita facility: one located 50 km to the west of the Tervita facility and the other located 50 km to the east.

- Suppose that there is also a Newalta facility located near the Tervita facility, which is accessible to both well locations.
- Suppose the customer's well is located 50 km west of the Tervita facility also has access to a non-merging competing facility, located around 75 km further west.
- The customer well to the east of the Tervita facility does not have access to any other non-merging competing facility.
- In my analysis, the well to the west would be experiencing a 3-to-2 merger (as its pre-merger options are Tervita, Newalta, and the competing facility).

[113] See backup for Duplantis Affidavit.

[114] Dr. Duplantis also has a measure of the change in competition experienced by a customer based on the market structure categorization, differentiating between "small" and "big" changes. This variable is subject to imprecise measurement due to the aggregation to the customer level instead of conducting the analysis at the well location level.

- The well to the east would experience a 2-to-1 merger (as its pre-merger options are only Tervita and Newalta).

66. With my model, I predict the price changes at these two wells separately. Dr. Duplantis, on the other hand, combines them because her analysis is at the customer level. She would, for example, use revenue-based weights to calculate a customer-level market structure comprised of the western-well market structure (i.e., 3-to-2) and the eastern-well market structure (i.e., 2-to-1), concluding that the customer market structure is 2.6, for example. Then she would round this up and conclude this customer as experiencing a 3-to-2 merger, when in fact, one of the wells is experiencing a 2-to-1 merger.[115]

67. She applies the same aggregation approach to her price measurement. She averages the prices paid to take in particular waste substances from the well to the west and the well to the east, and then she analyzes how the prices change after the merger. This approach masks the fact that the well to the east, which really experiences a 2-to-1 merger, may face a larger price increase while the well to the west, which really experiences a 3-to-2 merger, may face a smaller price increase. Generally, this aggregation approach may lead to noisier price impact estimates.[116]

68. Dr. Duplantis also claims to apply my methodology to the Tervita-Newalta merger. She compares the results from this exercise to the results she estimates and claims that my methodology yields estimates that are too high. This comparison is inappropriate for several reasons. First, as I discussed above Dr. Duplantis' analysis suffers from weaknesses that may diminish the accuracy and credibility of her results. Second, the two analyses rely on different customer-defined markets and, consequently, different customers.[117] For example, a well may be classified as part of a 2-to-1 market in one analysis and part of a monopoly in the other analysis. Indeed, based on her back-up

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[115] Duplantis Affidavit, ¶ 184 ("As a result, the calculation of the weighted average number of competitors available to a customer across all wells can result in a non-integral (sic) number, which I round to the nearest whole number. For example, if the weighted average of the number of competitors is 2.4, then I would categorize that facility-substance combination as having 2 competitors").

[116] Cameron, A. Colin and Pravin K. Trivedi, *Microeconometrics Methods and Applications*, Chapter 26, "Measurement Error."

[117] Section III.B uses average facility draw areas to identify wells that are part of 2-to-1, 3-to-2, etc… market structures. As described in the preceding paragraphs, she then aggregates these market structure classifications across wells operated by the same customer and sending waste to the same facility, even if those wells are actually located in different customer-defined markets. See Duplantis Affidavit, ¶ 182, fn. 205 ("Specifically, I use Dr. Miller's travel distance calculations for Tervita customers of 231.9 km for waste delivered to landfills, 144.1 km for waste delivered to TRDs, and 159.6 km for waste delivered to Water/TRDs."); Duplantis Affidavit, ¶¶ 184-185. In Section III.C, she applies my customer-defined markets to customers (or wells) active during the Tervita-Newalta merger.

materials, I find that this issue arises. For example, she omits well-level waste service prices from wells classified as part of a monopoly TRD market in her natural experiment, but these wells are part of her implementation of my second score auction. In that model, these wells are in a 2-to-1 TRD market. These omitted wells are located in rural regions of Alberta, and on average, they comprise a relatively large 2-to-1 TRD market that is missing from her natural experiment, and thus are not accounted for in her predicted price impacts even though these customers may have been greatly affected by increased market concentration.[118] Therefore, Dr. Duplantis' results here are not based on "apples-to-apples" comparisons of econometric results and simulation results.

4. **NEGATIVE PRICE EFFECTS**

69. Dr. Duplantis points out that I estimate a price decrease in certain relevant markets.[119] My analysis does not in fact predict that the merged firm will lower prices at any of the facilities that remain open after the merger. The negative numbers in my Exhibit 35 are a byproduct of how I weight the prices at remaining facilities in markets where there is a closure of a large facility. In markets where a specific set of facts apply, this methodology masks the actual predicted price increases.

70. As an illustration, consider the landfill market that includes the Secure and Tervita [redacted] facilities, as well as the [redacted] [120] As part of the merger, Secure's [redacted] facility is scheduled to close, which is the largest facility in the described market, taking in [redacted] percent share of the revenue. When a facility closes, I apportion its revenue to the facilities remaining in the market (and the outside option) according to their pre-merger market shares. In this case, the formerly Tervita facility receives [redacted] percent of revenue ($[redacted]), and the rest, $[redacted] goes to the municipal landfill and

[118] See market with the closest facility IDs equal to 1 and 73, corresponding to Tervita's Lindbergh Cavern and Newalta's Fort McMurray TRD. Note that wells in the 2-to-1 market comprise around $[redacted] in waste service revenue in 2017, which is out of around $[redacted] total across all 2-to-1 TRD markets from 2017. Most of the wells in this market deliver to the cavern, and on average, they travel longer distances than what is captured by the average TRD draw areas from my backup, which is the draw area distance Dr. Duplantis uses to classify wells into markets for her natural experiment. In contrast, the 90-draw areas that Dr. Duplantis calculates using her 2017 confirm that the facilities relevant to the example 2-to-1 market have much larger draw areas than the average she uses – which helps explain why using an average from my 2019 analysis is likely inadequate.

[119] Duplantis Affidavit, ¶ 133.

[120] The closest facility IDs for this example are [redacted] Note that there is also a second 4-to-3 landfill market comprised of the [redacted] facilities that includes a [redacted] facility. The patterns described in the main text apply to this market as well.

the outside option.[121] After the apportionment, the merged entity's post-market market share (which is from the formerly Tervita facility) becomes [redacted] percent. Note that this is lower than Secure's market share before the merger ([redacted] percent versus [redacted] percent). Because the markups (and prices) are determined by market share, the post-merger markup (price) of the merged entity will be lower than the pre-merger markup (price) of the closing Secure facility but higher than the remaining Tervita facility. When I report the price change in this market, I use a weighted average of these two changes. Specifically, I weight these two price changes according to the pre-merger market shares of Secure and Tervita facilities. In this case, because the closing Secure facility had [redacted] percent market share, the first price change (comparing Secure facility pre-merger price to post-merger formerly Tervita facility price) is assigned a very large weight, resulting in an overall price decrease estimate.

71. For markets such as these, this weighting approach masks the actual price increase. For example, if I weight the price changes by post-merger market shares, the price effect in the [redacted] market is +15%.[122]

72. I also note that my approach to apportioning closing Secure facility's customers may be especially conservative in this case. The [redacted] pre-merger revenue from oil and gas waste is only $[redacted] I assume that [redacted] facility and the outside option, more generally, will absorb a large amount of waste (hundreds of thousands of worth) from the closing Secure facility and attain a market share of [redacted] percent. If I instead assume that the merged firm will capture all, or virtually all, of the customers from the closed Secure facility, as Dr. Duplantis and Mr. Harington seem to suggest, the merged firm would attain a larger post-merger market share. Under those circumstances, my model would predict a price even higher than the price charged by the closing Secure facility, and, therefore, there would be no negative price calculation regardless of the weighting used.

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[121] Note that we re-apportion Secure's customers in the model instead of revenue, so the actual revenue apportioned to each of Tervita, [redacted] and the outside option may be a little different than a re-apportionment based only on revenue alone.

[122] The weighting formula I used in the Initial Affidavit is as follows: Price change = [(Pre-merger Secure price – Post-merger Party price) x (Pre-merger Secure revenue / Pre-merger Secure plus Tervita revenues)] + [(Pre-merger Tervita price – Post-merger Party price) x (Pre-merger Tervita revenue / Pre-merger Secure plus Tervita revenues). This calculation gives an average price change of -11%. A better weighting would be: Price change = [(Pre-merger Secure price – Post-merger Party price) x (Post-merger Secure revenue / Post-merger Secure plus Tervita revenues)] + [(Pre-merger Tervita price – Post-merger Party price) x (Post-merger Tervita revenue / Post-merger Secure plus Tervita revenues).

73. Again, economic theory and the simulation model indicate that facility closures in this context would reduce competition and increase the prices that customers pay. The handful of negative price effects that I report in my Initial Affidavit and back-up are an artifact of how I calculated market-level average effects and arise only in particular market configurations. A more appropriate weighting scheme would show that indeed prices do increase in these markets.

5. RESPONSES TO CRITICISM OF DEADWEIGHT LOSS ESTIMATES

74. In my initial report, I explained that the merger creates two sources of DWL. First, customers will have fewer waste service options because the merged firm is in the process of closing many facilities. With facility closures, some customers lose access to their most preferred facilities and the incremental value that these options generate for them. This loss occurs even if the customers continue to use third-party waste services at other, less preferred facilities, that is, if volume in the market does not decline. Second, customers may reduce the volume of waste services they consume as prices for these services increase. This loss of volume implies transactions that were advantageous to consumers and suppliers (hence economically desirable) are no longer taking place and creates a loss to the economy.

75. Dr. Duplantis does not dispute the second DWL effect from reduction in volume and, in fact, offers a DWL estimate with an approach similar to mine, which she estimates for the full transaction as well as for areas applicable to two hypothetical divestiture orders.[123] She, however, takes several issues with my DWL estimate regarding facility closures. I disagree with the concerns she raises and address them in this section.

76. First, she claims that that quantifying the DWL due to facility closure is "novel" and "a notable departure from standard methodologies." This claim is at odds with economic theory and the literature, as well as stated views of antitrust agencies. Dr. Duplantis herself has noted that merger analyses should consider the impact of non-price effects, including product variety loss.

77. Second, she views the second-score auction model to be unreliable for the purpose of calculating DWL from product variety loss, for many of the same reasons she views it as unreliable for the purposes of estimating merger price effects. She also uses a theoretical point by Dr. Waehrer—that the merging

[123] Duplantis Affidavit ¶ 158, Figure 20.

parties do not find it profitable to close a facility in the second-score auction model without any additional variable cost savings—to argue that my DWL estimates are internally inconsistent. As I noted in my Initial Affidavit, I view the second-score auction as a providing a reasonable way to estimate DWL from plant closures in this matter. Still, in my Initial Affidavit, I also calculated the DWL using another standard modeling framework (Bertrand), and, this estimate shows a comparable amount of DWL from facility closures. Ultimately, the DWL that I estimate is driven by market facts—in particular that many of the closing facilities have high market shares despite having prices that, on average, well exceed variable cost, which indicate that customers view facilities as differentiated and value this differentiation.

78. Third, Dr. Duplantis appears to suggest that the fact the Parties are viewed by many customers as close substitutes implies that there is very little, if any, differentiation between facilities beyond distance. This is a misguided inference. I have discussed other sources of differentiation above and in my Initial Affidavit. Further, it is a widely accepted notion in the econometric and industrial organization literature that sources of differentiation need not be directly observable to be quantifiable. My method leverages information from the data (which reflects the actual behavior of customers) to quantify the value of product differentiation.

5.1. Potential DWL from loss of options that customers view as differentiated is well established

79. Dr. Duplantis seems to question that there is a DWL from the closure of facilities and claims that my approach is "novel" and "a notable departure from standard methodologies."[124] I disagree with her. Welfare effects due to a loss of product choice is firmly founded in the economic theory of consumer choice. The economics literature and antitrust agencies have widely acknowledged this source of welfare effects.

80. First, to illustrate the DWL from a decrease in volume, consider a market with one firm. A transaction or trade between a customer and the supplier takes place when the value a customer places on the product or the service (or

[124] Duplantis Affidavit, ¶ 16. ("Dr. Miller purports to estimate what he refers to as 'social loss' or 'deadweight loss' from facility closures (what I will refer to in this report as his 'facility closure effect') using novel methods. His facility closure effect is a notable departure from standard methodologies for estimating deadweight loss based on predicted price increases and a resulting output effect that depends, among other things, on the elasticity of demand."). Dr. Duplantis labels my estimate as "facility closure effect" seemingly to distinguish it from "deadweight loss" that she seems to view as limited to "a price increase bring[ing] about a negative resource allocation." See Duplantis Affidavit, fn. 5.

"utility" derived) is greater than or equal to the cost of the supplier to produce that product or service. The difference between the customer's valuation and the supplier's cost is the gain from trade. Depending on the price at which the transaction takes place, this gain is divided between the customer and the supplier. The difference between the customer's valuation (often called "willingness-to-pay" as it is the maximum amount the customer would pay for the good or the service) and the price is the consumer surplus. The difference between the price and the supplier's cost is the producer surplus. If the trade does not take place, for example because the supplier increases the price to a level larger than the customer's willingness-to-pay, this surplus is lost. This is the DWL, stemming from a decrease in volume, which Dr. Duplantis calls "standard."[125]

81. In many cases, however, consumers face multiple product or service options that are differentiated from each other. Customers derive value from this product variety. Customers place different values on these products and choose among them based on the value they derive from each option and the price they pay for them (i.e., they chose the option that gives them the largest consumer surplus). When an option is removed from the market, their consumer surplus is reduced, even if the customer buys an alternative and the volume does not decrease. This is because the removed product may be the customer's most preferred option, and now she has to purchase a less preferred option.[126] She loses the incremental value that her most preferred option provides to her.

82. As an illustration, consider Coca Cola and Pepsi Cola. A consumer who has a preference for Coca Cola may switch to Pepsi Cola if Coca Cola is removed from the market. Even if she pays the same price for Pepsi Cola that she was paying for Coca Cola, she may be worse off because she derives less value from Pepsi Cola than Coca Cola. She loses the incremental value she derives from consuming Coca Cola instead of Pepsi Cola. Aggregating across consumers, if this loss is larger than the savings (efficiencies) from not having to offer Coca Cola, then there is a DWL.[127]

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[125] For example, Duplantis Affidavit, ¶ 25.

[126] Even customers who did not purchase the option that is removed from the market may be affected. For example, the removed option could be providing price discipline on the product the customer purchased, and when that discipline vanishes, the price paid by the customer may increase. But this effect is not part of the DWL from reduced product choice.

[127] Note that this comparison would not consider sunk costs because the question is the removal of an existing product. Sunk costs have been already realized. The removal of the product does not enable the producer to recover these costs and add them back to the economy. Only reduction in future costs would be considered.

83. In the context of the present merger, different customers may prefer different facilities for a variety of reasons, and indeed prices adjust with some of the differentiating factors.[128] If a facility closes, its customers could be worse off even if they send waste to a different facility at the same price they were paying before, because the next-best facility simply provides less value to them. This is the source of the DWL due to plant closures that I quantified in my Initial Affidavit.[129]

84. Potential welfare losses from the removal of products (or welfare gains from new products) is extensively studied in the economic literature. Empirical work also quantifies these effects. In a strand of the literature, researchers estimate models of demand and supply based on observed consumer choices, and product or service characteristics.[130] The resulting demand and supply models allow the researcher to value customer preferences for different products or services, such as preference for vehicle horsepower, mileage, type, or size in the market for automobiles. Researchers can then compare the utility a customer derives from an initial choice set to the utility from an alternative choice set that may have new products added or some products removed. The difference in utility approximates the value (i.e., consumer welfare) a customer derives from the added or removed choice. Examples of empirical work that estimated welfare effects of new product include Petrin's study of the introduction of minivans, Goolsbee and Petrin's study of direct broadcast satellites, Brynjolfsson et al.'s study of increased variety at online booksellers, Hausman and Leonard's study of the introduction of Kleenex Bath Tissue, Hausman's study of the introduction of Apple Cinnamon Cheerios, and Gentzkow's study of the introduction of an online newspaper in Washington D.C.[131]

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[128] See Section 3.1.1 and Section 3.1.2.

[129] For a technical discussion of the DWL from loss of options, see Section 7.6 in my Initial Affidavit. This formula is derived from consumer demand behavior and does not depend on whether customers are price takers (as in a posted-price market) or negotiate prices (as in price discrimination markets).

[130] Some papers also use other factors such as customer characteristic.

[131] Amil Petrin, "Quantifying the Benefits of New Products: The Case of Minivan," *Journal of Political Economy*, 2002, vol. 110, no. 4. ("My results suggest that the introduction generated large welfare gains for consumers…") Goolsbee, Austan, and Amil Petrin. "The consumer gains from direct broadcast satellites and the competition with cable TV." *Econometrica* 72, no. 2 (2004): 351-381; Brynjolfsson, Erik, Yu Hu, and Michael D. Smith. "Consumer surplus in the digital economy: Estimating the value of increased product variety at online booksellers." *Management science* 49, no. 11 (2003): 1580-1596. Hausman, J., Leonard, G. "The Competitive effects of new product introduction: A case study," The Journal of Industrial Economics, vol L, no. 3, September 2002. Gentzkow, Matthew, "Valuing New Goods in a Model with Complementarity: Online Newspapers," American Economic Review, 97 no. 3 (2007): pp. 713–744. ("For consumers, the online edition generated a per-reader surplus of $.30 per day, implying a total welfare gain of $45 million per year.") Hausman, Jerry A. 1997. "Valuation of New Goods under Perfect and Imperfect Competition." In *The Economics of New Goods*, ed. Timothy F. Bresnahan and Robert J. Gordon. 209–37. ("I also find that consumers highly value new goods, which provide significant consumer's surplus despite the existence of other brands which compete closely with the new brand.")

85. Antitrust agencies have recognized that mergers may have anticompetitive non-price effects, including the effects of removal of products from the market. For example, Canadian Merger Enforcement Guidelines state that "[t]he Bureau also assesses the effects of the merger on other dimensions of competition, such as quality, product choice, service, innovation and advertising—especially in markets in which there is significant non-price competition."[132] The 2010 U.S. Horizontal Merger Guidelines explain that "[e]nhanced market power can also be manifested in non-price terms and conditions that adversely affect customers, including reduced product quality, reduced product variety, reduced service, or diminished innovation. Such non-price effects may co-exist with price effects, or can arise in their absence.[133]

86. In her past writings, Dr. Duplantis also recognized that mergers may have non-price effects, including loss of consumer choice, which would create welfare losses. In her 2017 article "The importance of quantifying non-price effects in Canada," she discusses the welfare losses from non-price effects, such as the elimination of a product resulting from a merger. She explains that these effects are well-recognized and can be quantified using economic models, and she summarizes some of the prior economic literature that estimated non-price effects.[134] She in fact proposes approaches to quantify the effects from "the elimination of a product as a result of a merger" that can be incorporated in merger review analysis comparing anti-competitive effects against claimed efficiencies in Canada.[135]

5.2. Responses to Dr. Duplantis' claims that my DWL estimates from facility closures are unreliable due to my use of the second-score auction model

87. Dr. Duplantis claims that my DWL estimation is unreliable because it relies on the second-score auction model. She points to her criticism related to the use of the second-score auction model to estimate price effects, and also to a

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[132] Canadian Merger Enforcement Guidelines, Section 2.2.

[133] Duplantis, R., Cass, I. "The importance of quantifying non-price effects in Canada," Law and Economics Concurrences No. 2- 2017.

[134] Duplantis, R., Cass, I. "The importance of quantifying non-price effects in Canada," Law and Economics Concurrences No. 2- 2017, pp. 55-56.

[135] Duplantis, R., Cass, I. "The importance of quantifying non-price effects in Canada," Law and Economics Concurrences No. 2- 2017, p. 57 ("Another possible means for quantifying non-price effects in a merger context would be to use properly defined consumer surveys or conjoint studies… Conjoint analyses could be used to quantify a consumer's willingness to pay for the introduction of a new product feature or to prevent the elimination of a product as a result of a merger. This quantification of willingness to pay could be incorporated into the quantified trade-off analysis required in Canada.").

paper by Dr. Waehrer that shows that facility closure is not profitable in a second-score auction model unless there are other variable costs savings. I address these concerns in this section.[136]

5.2.1. *Dr. Duplantis' methodological critique based on my use of second-score auction model does not apply to the alternative approach I used to quantify DWL from facility closures*

88. As I explained in Section 3.2, models are approximations that are meant to capture the salient features of markets but are not intended to be perfect representations of them. I view the second-score auction to be a reasonable way to approach this market where there is wide spread price discrimination. I used this model to estimate the DWL using two approaches, the revenue-based approach and the market share-based approach. The revenue-based approach captures the full effect of plant closures on DWL, and the share-based approach captures the effect only on the markets that we specifically delineate.[137] My Initial Affidavit reported estimates of $78 million and $55 million with these approaches, respectively. If I adjust the margins that I used in my Initial Affidavit for the additional variable costs claimed by Mr. Harington, then these estimates are $72 million and $51 million (see **Exhibit 2**).

[136] To clarify, I used two approaches to quantify DWL from facility closures in my initial report. I called them "profit-based" and "market-share based" approaches. These labels refer to the different information sources I used to estimate the incremental benefit customers derived from closing facilities. I used the second-score model with both the "profit-based" and the "market-share" approaches to estimate the DWL from facility closures. I also used a different model, based on Bertrand competition, with the "market-share" based approach to estimate the DWL from facility closures. Dr. Duplantis criticizes the second-score auction in general and also my "profit-based" approach citing to a theoretical result by Dr. Waehrer. Regarding the "profit-based" approach, she claims that it is inconsistent because it implies that facility closures after the merger would be unprofitable for Secure. Dr. Duplantis does not directly discuss the "market-share" approach using the Bertrand model. Neither of her criticisms apply to the estimates obtained from suing the Bertrand model with the share-based approach.

[137] In the profit-based approach, I estimate the DWL by calculating the profits of closing facilities from their financials and adding them up. This approach is based on the intuition that facilities, with perfect price discrimination, can capture all of the incremental value they generate for customers as profit. When a facility closes, this incremental value (as measured by variable profits) is lost as DWL. In the market share approach, I model consumer demand (logit model) and use the observed consumer choices between facilities (i.e., market shares) to estimate their valuation of a set of available facilities. When the set of available options shrink, consumers' valuation decreases, and this decrease is the DWL. Market shares are informative because, intuitively, facilities that are highly valued by customers would have higher market shares (see Section 7.6 in my Initial Affidavit). This approach is commonly used in the academic literature to estimate the value of new or disappearing products to customers. See, for example, Petrin, Amil, "Quantifying the Benefits of New Products: The Case of the Minivan," Journal of Political Economy, 110 no. 4 (2002): pp. 705–729; Ackerberg, Daniel A., and Marc Rysman, "Unobserved Product Differentiation in Discrete-Choice Models: Estimating Price Elasticities and Welfare Effects," The RAND Journal of Economics, 36 no. 4 (2005): pp. 771–788; Gentzkow, Matthew, "Valuing New Goods in a Model with Complementarity: Online Newspapers," American Economic Review, 97 no. 3 (2007): pp. 713–744. Also see my discussion in Section 4.1.

89. In my Initial Affidavit, I also reported estimates of DWL from facility closures using another standard modeling framework, that of Bertrand competition. In this model, facilities do not price discriminate among customers in the same market (but prices can vary across markets). Therefore, the Bertrand model is not subject to the concerns that Dr. Duplantis raises about whether the second-score auction overstates price discrimination. Dr. Duplantis does not directly comment on my DWL estimate from the Bertrand model.

90. My Initial Affidavit obtains an estimate of DWL due to facility closures of $40 million with the Bertrand model using the market share-based approach. This estimate represents effects within the geographic markets that I delineate, and so are comparable to results from applying the second-score auction model in the share-based approach (which yields DWL estimate of $55 million).[138] If I adjust margins for the additional variable costs claimed by Mr. Harington, then the DWL estimate from the Bertrand model is $37 million (see Exhibit 2).

91. It is not surprising that both the second-score auction model and the Bertrand model obtain comparable levels of DWL from facility closures ($55 million versus $40 million). Both estimates are driven by the fact that many of the closing facilities have large market shares and set prices that are well above

[138] These estimates only measure the DWL in the relevant markets (facilities overlapping draw areas). It does not consider the DWL to customers who may be outside the closed facility's draw area or customers who may be located in parts of the closed facility's draw area that do not overlap with the other merging party's draw areas.

variable costs (i.e., they have high margins). As we observe that consumers select these facilities despite high prices, we can infer that they provide considerable value to consumers. And as margins are high, suppliers gain considerable value (i.e., profit) from the sales they produce. Putting these together, the data indicate that DWL from facility closure is likely to be substantial. The second-score auction model and the Bertrand pricing model simply provide a formal way to interpret these market facts, and combine them into a specific estimate of DWL.

5.2.2. *Responses to Dr. Duplantis' claim that my DWL calculation is inconsistent with the planned plant closures*

92. Now I turn to Dr. Duplantis' critique of my profit-based approach. Dr. Duplantis points to a theoretical result by Dr. Waehrer, that, within the strict confines of the second-score auction model, a merger would not lead the merging firms to close an economically profitable facility unless doing so generates some other benefit, such as lowering costs at other facilities.

93. I do not interpret the finding as evidence that the DWL estimates that I obtain from the second-score auction are unreliable. My profit approach follows from the observation that a facility's economic profitability is related to the incremental value it creates for customers. This observation is based on basic economics, not derived from any modeling assumptions. It is based on consumer rationality (consumers choose services that provide the highest surplus among the options) and firm profit maximization (firms capture at least some of this value). In contrast, Dr. Waehrer's theoretical result is a narrow one proven to hold only for the second-score auction. It does not extend, for example, to variants of the second-score auction that account for some amount of buyer power. It would be inappropriate to discount robust, data-driven estimates of DWL in favor of such a narrow theoretical result.

94. To illustrate why Dr. Waehrer's result is not general, I provide a numerical example that allows for bargaining. Consider a modified model where customer has bargaining power and is able to negotiate the prices.[139] For simplicity, I will continue the example I used in my Initial Affidavit. Recall that I posited an example where there are two facilities and two types of customers.

[139] Dr. Duplantis claims that buyers power exists in this market. Duplantis Affidavit Section III.A.3.

- Customer type I values facility A at $40 and facility B at $20. Customer type II values facility A at $20 and facility B at $40. There are 10 of each type of customer. Each facility can produce the service at $10 cost and also has fixed cost of $100. In my initial report, I described a pricing model where the facilities could extract all the surplus. In that case, customer type I would use facility A and pay $30.[140]
- Suppose that instead, the consumer has bargaining power and can keep some of the incremental surplus. Assuming that the consumer and the producer equally share the surplus from trade, the trade would take place at $20. To see this, consider the range of prices the trade could occur. Facility A would not charge less than $10 (its costs). Customer type I would not pay more than $30 (otherwise it would use facility B at $10 and achieve a higher surplus). With equal bargaining power, they settle on the mid-point, $20.
- The same logic applies to the trade between customer type II and facility B. They also trade at $20.
- In this case, each facility earns $100 in variable profit ($20 price minus $10 cost times 10 customers) and $0 in total profits once the fixed costs are deducted. Each customer type has consumer surplus of $200 ($40 valuation minus $20 price). The total surplus is $400 (adding up all consumer surplus and total profits).

95. Now, consider the situation with a merger where both facilities remain open.

- After the merger, the most facility A can charge is $40, not $30. This is because facility B no longer provides an outside option for consumer type I (i.e., consumer type I can no longer threated facility A that it can use facility B at a price of $10). The lowest price facility A can charge remains at $10. With equal bargaining power, they settle at a price of $25.
- In this case, each facility earns $150 in variable profit ($25 price minus $10 cost times 10 customers) and $50 in total profits once fixed costs are deducted. The aggregate profit of the firm from the two facilities is $100.

[140] The best offer by facility B is $10, its costs. This offer creates a consumer surplus of $10 ($20 valuation minus $10 price). Facility A can charge $30 (or slightly less), offering the same surplus to the consumer ($40 valuation minus $30 price) and win the sale.

- Each customer type has consumer surplus of $150 ($40 valuation minus $25 price). The total surplus is still $400 as both facilities remain open. The merger changes how this surplus is divided (total profits increase, consumer surplus decreases).

96. What if facility A is closed? Is there a DWL (i.e., decrease in total surplus) and is this closure profitable for the merged entity? The answers are "yes" and "yes."

- If facility A is closed, customer types I and II bargain with facility B. Customer type I pays $15. Customer type I is willing to pay at most $20 and facility B is willing to charge at least $10. With equal bargaining power, they settle at the midpoint of $15. With the same bargaining logic, customer type II pays $25.
- The facility earns $200 in variable profit ($5 from each customer type I and $15 from each customer type II) and $100 in total profits once fixed costs are deducted. Note that the total profits ($100) is not lower than the total profits if both facilities operated ($50 from each facility for a total of $100).[141]
- Customer types I have surplus of $50 ($20 valuation minus $15 price times 10 customers) and customer types II have surplus of $150 ($40 valuation minus $25 price times 10 customers) for a total consumer surplus of $200. The total surplus is now $300 ($100 aggregate profits and $200 consumer surplus), which is lower than the total surplus with both facilities operating. In this example, total surplus decreases when a facility is closed but the profit of the firm is not lower with the closure.

97. This modified example rebuts Dr. Duplantis' criticism that my profit-based approach to quantifying DWL is internally inconsistent because it implies Secure's closing of facilities would decrease its overall profitability. Her criticism is specific to one pricing model (perfect price discrimination) that I used to capture the widespread price discrimination in the market. Her narrow criticism does not invalidate the basic economic fact that firm profits are

[141] Note that with other numerical examples, it may be more profitable to shut down a facility after the merger. In the above example, if Facility A's fixed costs are $150, then merged firm's profit is higher if they operate one facility instead of two.

related to the incremental value the firm creates for customers (a value that is lost if the firm is closed).[142]

5.3. Responses to Dr. Duplantis' claims that there is little to no product differentiation besides the location of plants

98. Dr. Duplantis appears to suggest that my DWL estimate is overstated using two arguments: (1) transportation cost is a primary driver of choices that is observable and (2) the increase in transportation cost I calculated only accounts for less than 10 percent of my DWL estimate.

99. With respect to her first argument, I have discussed other factors that appear to differentiate facilities in the eyes of customers, both in my Initial Affidavit and above (Section 3.2.1).

100. I also explained that differentiation can be inferred from observed data. For example, high markups are an indication of differentiation. Facilities are able to maintain high markups if they provide to customers different features than their competitors. Customers would accept a facility's higher prices if they derive incremental value from that facility. As another empirical observation indicating differentiation between facilities, data show that customers often choose facilities that are not the closest. Based on the Secure and Tervita transaction data, I find that large percentages of transactions for customers (defined as well sites) are for waste sent to farther away facilities when there is a closer facility.[143]

101. Further, the industrial organization and econometric literature has long recognized that there may be characteristics of a product that are valued by customers but may not be observable to the researcher or individually quantifiable. This does not mean, however, that they do not exist. As I explain in Section 4.2, my approach leverages information on observed customer choices and margins to quantify the overall value of closed facilities even with

[142] When a customer trades with the producer she values higher, the trade creates additional social surplus compared to when she trades with another producer that she values less. This additional social surplus is the difference between her valuation of her first and second choices. The price at which the trade occurs only determines the division of this incremental surplus. Under a pricing model that posits that the producer captures all the incremental surplus (e.g., second-score auction), variable profits are an exact estimate of the additional social surplus created. Under other pricing models, variable profits are a lower bound estimate of the additional social surplus (because some of the social surplus is captured by the customer).

[143] I find that [redacted] percent of landfill, [redacted] percent of TRD, and [redacted] percent of water disposal transactions are at facilities operated by one of the Party facilities that are not the nearest facilities to the well sites generating the waste. See my workpapers.

all characteristics of a facility cannot be observed by the researcher or their values individually quantified. This is a standard approach in the industrial organization literature.[144]

102. I now address Dr. Duplantis' claim that my DWL estimates from facility closures are too large in comparison to my estimate of DWL from increased transportation costs.[145] First, as there appear to be many relevant sources of differentiation that are relevant for customers, it would not be surprising if DWL well exceeds the increase in transportation costs. Still, the approach I took to estimate increased transportation costs in my Initial Affidavit used conservative assumptions that may have led to an understated estimate. For example, I used a conservative assumption on hourly truck rates.[146] I used $[redacted] per hour even though many documents indicate that trucking costs can be as high as $[redacted] (current costs may be even higher with more expensive price of gasoline and diesel). Using $[redacted] per hour would increase the estimate by approximately 42 percent, resulting in predicted transportation costs increases of between $9.2 and $10.2 million.

103. I also note that estimates based only on travel distances do not account for any additional trucking fees incurred due to longer wait-times at the waste service facility, even though trucking fees are paid by the hour and not based on distance.[147] Longer wait-times may occur if the closures increase congestion at

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[144] See, e.g., Berry, Steven T. "Estimating discrete-choice models of product differentiation." *The RAND Journal of Economics* (1994): 242-262; Berry, Steven, James Levinsohn, and Ariel Pakes. "Automobile prices in market equilibrium." *Econometrica: Journal of the Econometric Society* (1995): 841-890; Berry, Steven, James Levinsohn, and Ariel Pakes. "Differentiated products demand systems from a combination of micro and macro data: The new car market." *Journal of political Economy* 112, no. 1 (2004): 68-105; Nevo, Aviv. "Measuring market power in the ready - to - eat cereal industry." *Econometrica* 69, no. 2 (2001): 307-342.

[145] Duplantis Affidavit, Section IV.C.1.

[146] Miller Initial Affidavit, ¶ 226, Exhibit 25. Documentary evidence suggests that the fees may range from $[redacted] to $220. For example, one document assumes a $[redacted] per hour fee to rent a truck in Alberta and $[redacted] in BC. See Email from tnickel@tervita.com to cmacmullin@tervita.com and lgailey@tervita.com, "RE: [redacted] Volumes," October 15, 2020, TEV00223412, attachment "Trucking Differential – [redacted] xlsx," TEV00223413. See also TEV00045140 ($190 per hour in BC, else $150); Witness Statement of David Hart (Canadian Natural Resources Limited), February 22, 2022, ¶ 15 ("In deciding which facility to use, CNRL considers the total cost of disposal, which is the cost of trucking plus tipping fees at the applicable waste disposal facility. Trucking costs include time required for loading, unloading and standby/wait times. Trucking costs vary due to a number of factors such as truck availability, fuel and maintenance costs and road conditions (amongst other things) but typically range from [redacted] per hour in western Canada.").

[147] Several witness statements confirm that wait-times and "turnaround" times are considerations when deciding to which facility they should send waste. Witness Statement of Paul Dziuba, (Chevron), February 24, 2022, ¶ 16 ("These delays increase transportation costs, as transportation costs are charged for both travel time and wait times. They also result in delayed operations at Chevron's sites if waste trucks are not available when required."); Witness Statement of Shanley Bowersock, February 23, 2022, ¶ 13 ("A rate for any additional wait time is usually built into LB Energy's contracts with the producers. In other words, once LB Energy's trucks get to the facility, if there are additional wait times, the producer is charged on a per hour basis for that time. In LB Energy's experience, some facilities have wait times in excess of 6 hours when they are busy."); Witness Statement of ConocoPhillips, February 23, 2022, ¶ 16; SES0045741 ("SECURE is willing to guarantee truck turnaround times

the facilities that remains open.[148] In fact, Mr. Paul Dziuba of Chevron explained that they have been experiencing longer wait times since facilities have been closed as a result of the transaction. According to Mr. Dziuba, wait times are becoming a significant issue and range from 15 minutes up to three hours.[149] Alternatively, if customers have fewer viable facilities from which to choose then, in any given week, there is a higher probability that they must select one with longer wait-times.

104. Wait-times can comprise several hours, wherein one company presentation reported a range of [redacted] hours in wait-times, while the drive-times ranged from [redacted] hours.[150] I estimate that trucking waste from customer well sites to closing facilities required around 178,000 trips in 2019.[151] These trips will now be taken to another facility. If trucks experience an additional 30 minutes of wait-time per trip, there would be approximately $13.8 million in additional costs, assuming $[redacted] per hour trucking rate.[152] If I assume a $[redacted] per hour trucking rate, the estimate is over $19.6 million.

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of 30 minutes for Cenovus LF loads and cover any additional wait time charges in excess of 30 minutes when at the facility. We are confident that elimination of wait-related charges provides additional operational cost savings to Cenovus."). I understand that facilities may send trucks to other, farther away facilities if there are waiting times, incurring higher transportation costs. For example see, SESL0032727.

[148] For example, TEV00111509 shows that increased volumes also increase waiting times. SESL0032727 shows that high volumes created wait times at some facilities.

[149] Witness Statement of Paul Dziuba, April 8, 2022.

[150] [redacted] Witness Statement of TAQA [RCFC00002_000000232], ¶ 13 ("Transporting waste further than otherwise necessary, such as when a facility is full or closed, can significantly increase the total cost of disposal.").

[151] See my workpapers. While the increased transportation costs from facility closures in my Initial Affidavit only included those customers that would travel farther to reach one of the Parties' facilities post-merger (and closure), other facility closure costs potentially affect all customers of the closed facilities, as well as customers of the facilities that take in waste from the closed facilities' customers.

[152] I have used 30 minutes of additional wait time as an illustration; however, my back-up includes estimates for 15-minute, 30-minutes, 45-minute, and 1 hour increases. See my workpapers. Moreover, my estimates may be conservative based on descriptions of wait-times in the witness testimony. See Witness Statement of Shanley Bowersock, February 23, 2022, ¶ 13 ("A rate for any additional wait time is usually built into LB Energy's contracts with the producers. In other words, once LB Energy's trucks get to the facility, if there are additional wait times, the producer is charged on a per hour basis for that time. In LB Energy's experience, some facilities have wait times in excess of 6 hours when they are busy."); Witness Statement of Chad Hayden, February 9, 2022, ¶ 11 ("However, tipping fees are generally determined by our clients' own negotiations with disposal site operators, and may differ significantly for each client at each potential disposal site. Capacity and wait-times will also vary depending on the site and day; wait times at facilities can be as long as 12 hours. Higher tipping fees, longer wait times, or limited capacity may result in a customer optimally choosing a site that is further from the waste's origin.").

Moreover, these additional costs only account for the added wait-times incurred by customers of the closing facilities. Existing customers of the absorbing facilities may also experience increase in wait-times because of the facility closures. Consequently, my estimate could under-represent the total potential loss caused by increased wait-times.

6. RESPONSES TO MEASURING DWL FROM VOLUME CHANGE

105. In Section 5 of her report, Dr. Duplantis acknowledges that there is DWL that arises due to the increase in prices (and decrease in volume) caused by the merger and puts forth an estimate of DWL. She estimates that the merger will result in $1.2 to $1.6 million DWL depending on the scenario she considers (two divestiture scenarios versus full transaction).[153] Dr. Duplantis' estimates are based on the price impact she calculates from her natural experiment analysis.[154] If the price impact of the transaction is larger (as I estimated in my analysis), her estimates of the DWL from volume reduction would increase. For example, even if the price impact is between my estimates and her estimates, the DWL from the full transaction is around $6 million annually (see **Exhibit 3**).

[redacted]

[153] Duplantis Affidavit, Figure 20.

[154] Duplantis Affidavit, ¶ 168.

7. APPENDIX

7.1. Variable cost margins

106. As described in Section 3.2.4, even if I take into account the additional costs that Mr. Harington claims are variable in nature (depletion and incremental asset retirement obligations), the price impact and DWL from facility closure results from my Initial Affidavit remain largely unchanged (see Exhibit 1) and (see Exhibit 2).

107. I account for the depletion costs by using the line item for depletion costs in the Parties' financial statements. As described in Section 3.2.4, I understand that these costs only apply to landfills. To account for an estimate of landfill AROs, I use the "estimated closure cost" and the "post-closure (ongoing)" that captures the costs to monitor the waste once the facility has closed.[155] Each of these numbers is spread over the life of the facility, so for a facility that has been operating the last 10 years, I divide each of the two costs by 10 to get an annualized incremental cost for them. I then assume 10 years of monitoring costs, so I multiply the annualized on-going cost by 10. The sum of the two annualized costs is assumed to comprise the variable portion of the ARO.[156]

108. TRDs are treated differently because, as I understand, there is 6-year schedule to handle the ARO that consists of decommissioning in year 1, environmental assessments in year 2, remediation in years 3 and 4, reclamation in year 5, monitoring in year 6, and DSA and recertification in year 7.[157] The costs in years 2, 6 and 7 are all generally fixed for facilities of a certain size at $[redacted] or $[redacted] depending on the cost, therefore I do not account for these costs in my estimate of the variable component of ARO. The first year to decommission involves handling the facility and plant fixed capital, which I also exclude from my variable ARO estimate. The remaining costs for remediation and reclamation that take place in years 3 to 5 are included, however, and I spread these costs across all years the facility has operated.[158]

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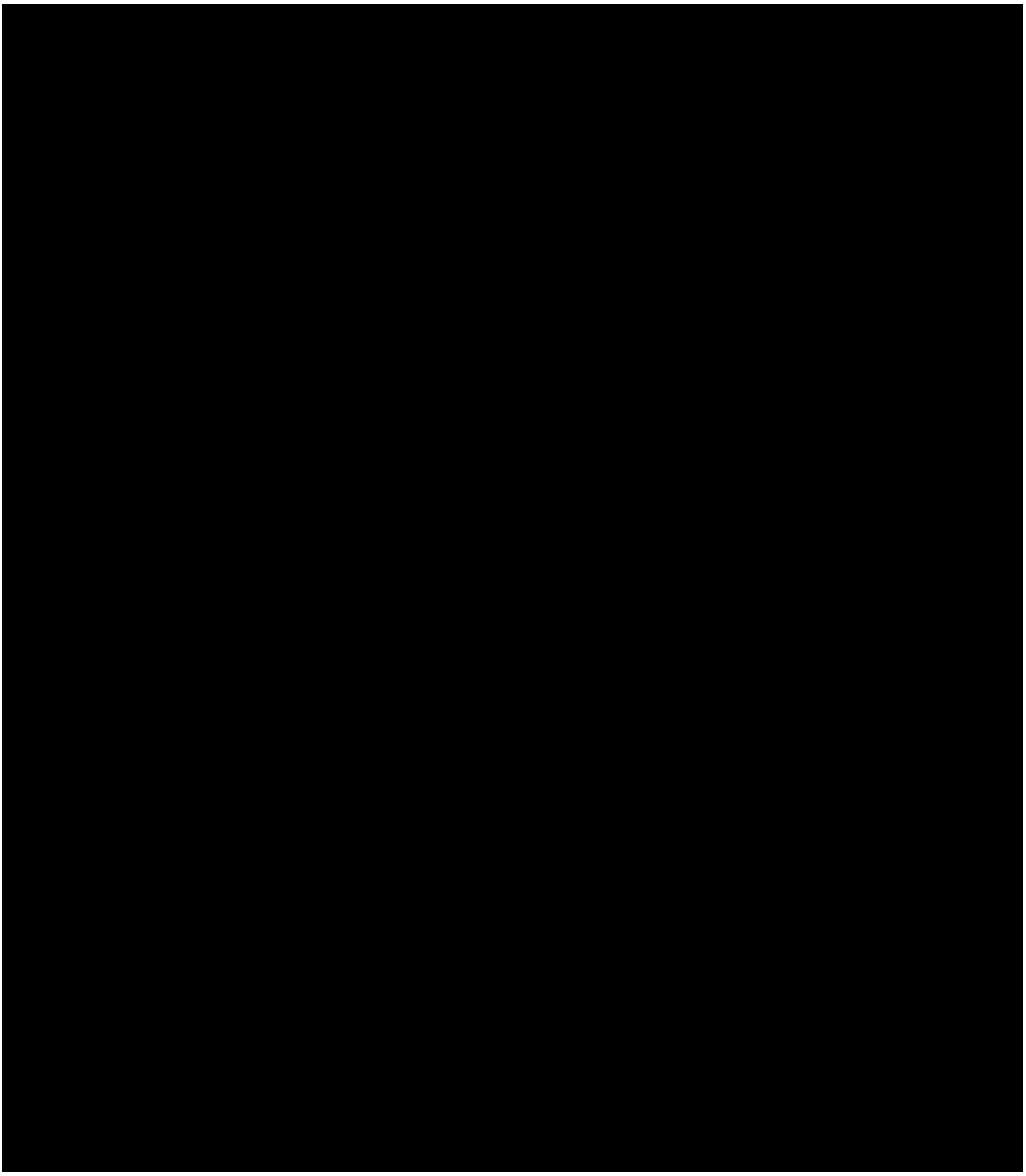
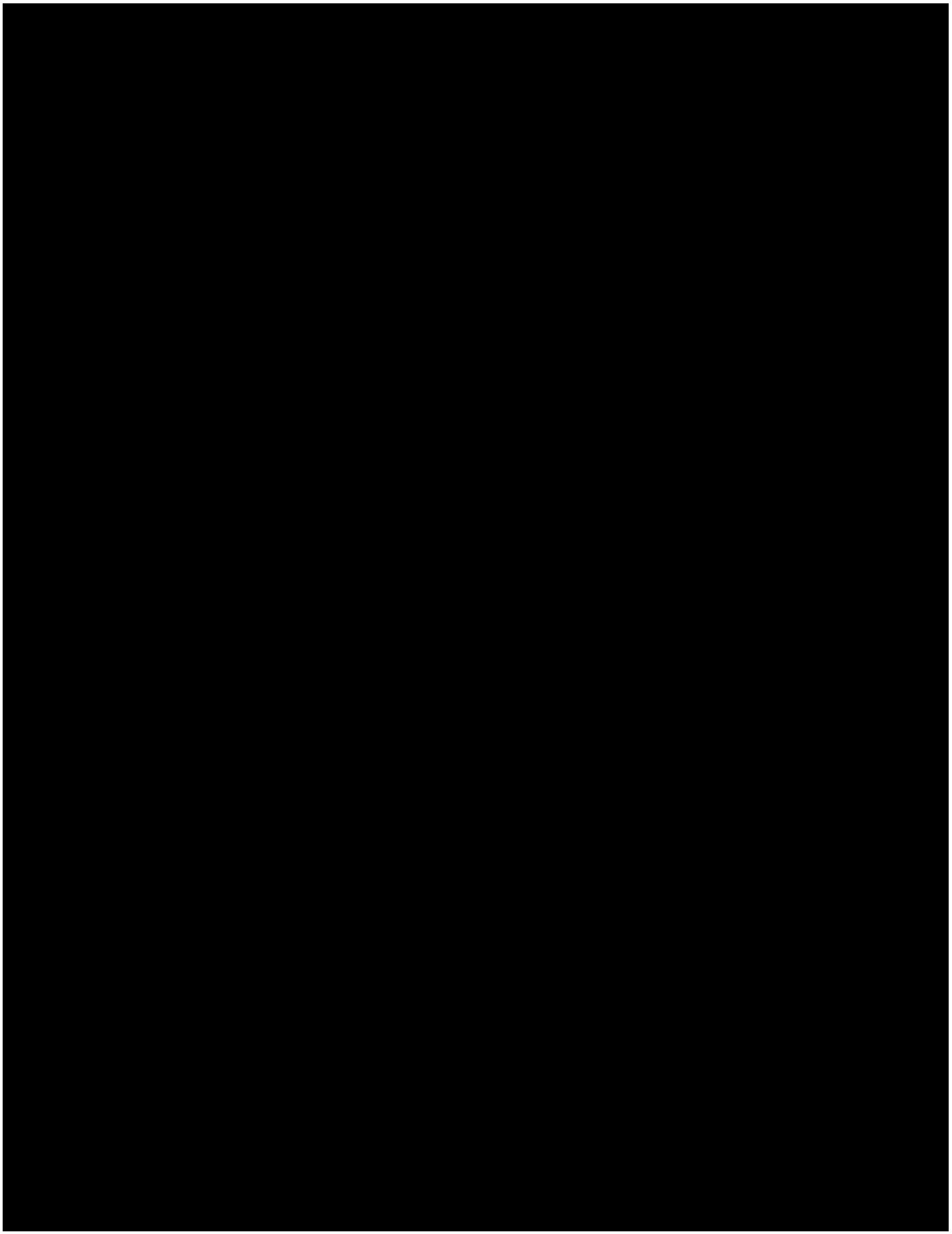
[155] SESL0035131.xlsx.

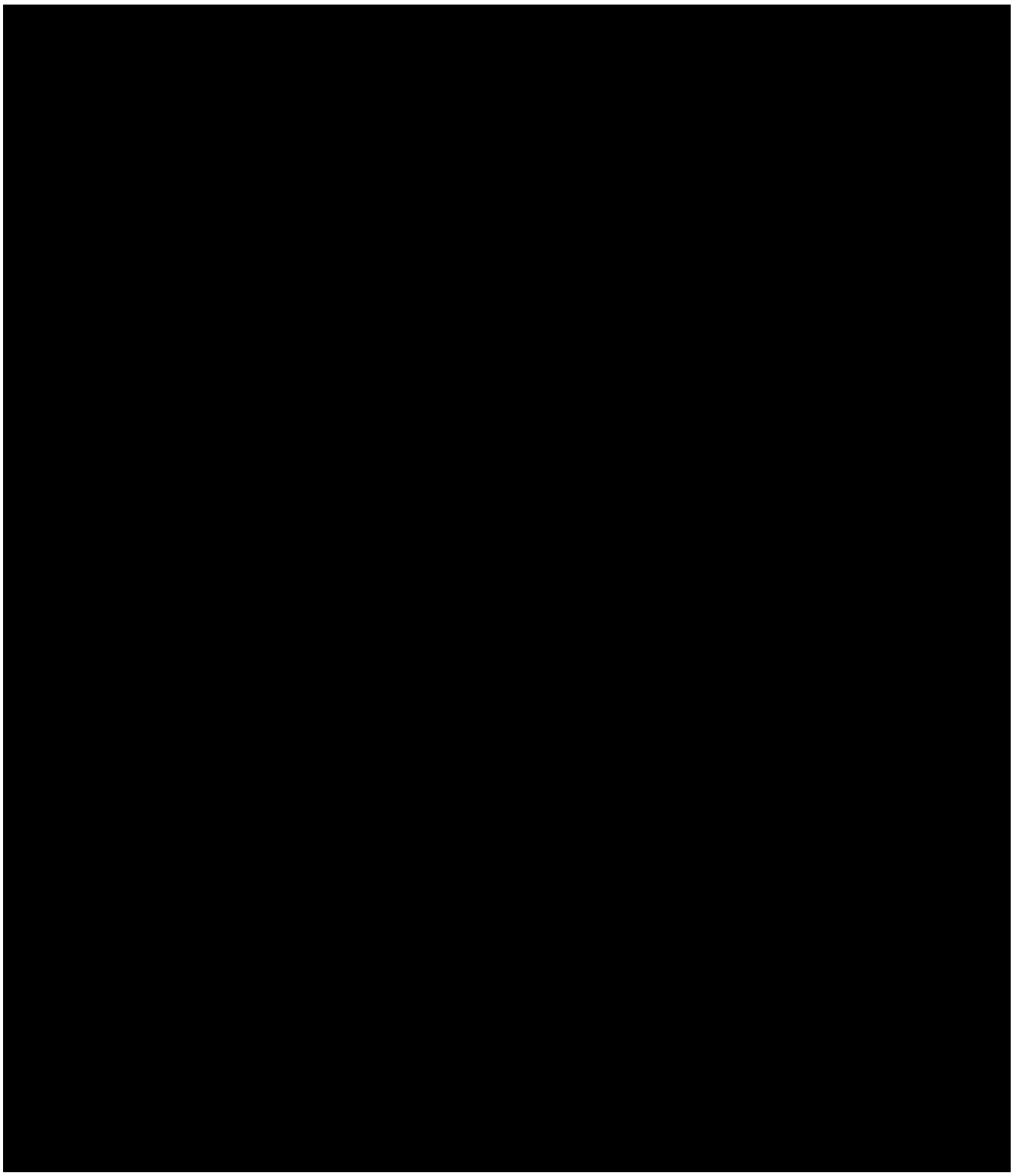
[156] $ARO_{landfill} = Estimated\ Closure\ Costs\ x\ \left(\frac{1}{y}\right) + Post\ Closure\ Ongoing\ Costs\ x\ \left(\frac{1}{y}\right) x\ 10$

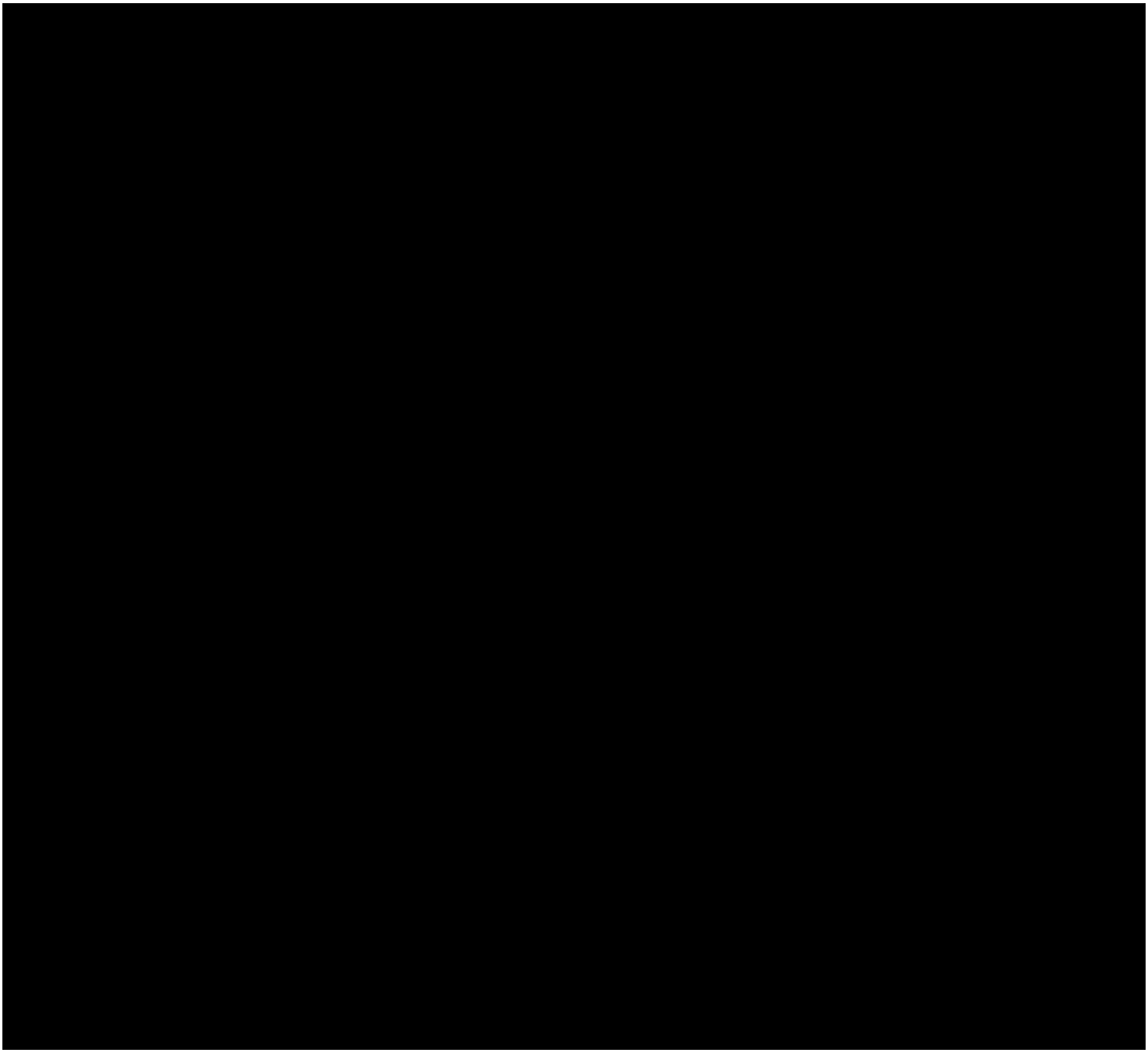
[157] SESL0007576.

[158] SESL0039188; SESL0035131 (ARO). I use information about permitting date and other documents to estimate the years in which the facilities opened. For all facilities that do not have an opening date or ARO data, I assume that the facility incurs the average ARO based on all facilities from which I have data. The average annualized AROs are calculated separately for landfills, TRDs, and water wells.









[redacted]

Nathan Miller

Nathan Miller, Ph.D.
April 11, 2022