CT-2021-002

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 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 section 92 of the *Competition Act***.**

BETWEEN:

THE COMMISSIONER OF COMPETITION

Applicant

- and -

SECURE ENERGY SERVICES INC.

Respondent

AFFIDAVIT OF DR. RENÉE M. DUPLANTIS
(Sworn March 25, 2022)

I, **Renée M. Duplantis**, of the City of **Toronto**, in the Province of Ontario, **MAKE OATH AND SAY**:

1. I am a Principal in the Toronto Office of The Brattle Group ("**Brattle**"), a multinational firm that provides economic, regulatory and financial consulting services. I am currently the leader of Brattle's Canadian Antitrust & Competition Practice. I have been retained by Blake, Cassels & Graydon LLP, counsel for the respondent, to provide my expert opinion as an economist regarding certain matters at issue on this application, which are set out in my expert report.

2. Attached as Exhibit "A" to my affidavit is my expert report in this matter dated March 25, 2022.

3. Included as Appendix "A" to my report is my curriculum vitae.

4. Included as Appendix "B" to my report is my Documents Relied Upon

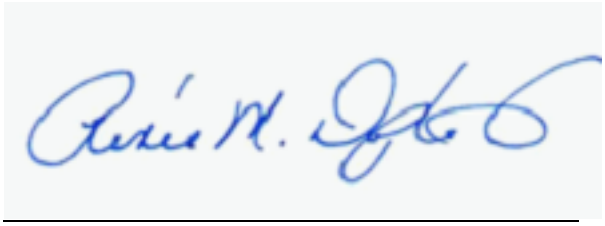
5. Included as Appendix "C" to my report is my acknowledgement of expert witness.

6. Included as Exhibit "1" to my report is an electronic copy of my data, programming code, and workpapers.

7. I swear this affidavit for the purposes of the within application and for no other purpose

SWORN remotely by)
Renée M. Duplantis)
in the City of Toronto in the Province)
of Ontario, before me in the City of)
Toronto in the Province of Ontario,)
on March 25, 2022 in accordance)
with O. Reg 431/20, Administering)
Oath or Declaration Remotely.)

A commissioner for taking affidavits



Renée M. Duplantis

This is Exhibit "A" to the Affidavit
of
Renée M. Duplantis
Affirmed on March 25, 2022

Exhibit A

EXPERT REPORT OF RENÉE M. DUPLANTIS, PHD

COMMISSIONER OF COMPETITION V SECURE ENERGY SERVICES INC., CT-2021-002

MARCH 25, 2022

Brattle

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I. Introduction

I.A. Assignment

1. Blake, Cassels & Graydon LLP ("Counsel"), counsel to SECURE Energy Services Inc. ("SECURE"), has requested my opinion in respect of SECURE's acquisition of Tervita Corporation ("Tervita," and together with SECURE, the "Parties") (the "Transaction").[1] In particular, I have been asked to assess the economic reliability of the model of asserted price effects from the Transaction in the Expert Report of Nathan H. Miller, submitted on behalf of the Commission of Competition ("Commissioner"), as well as Dr. Miller's methodologies and opinions on the Transaction's welfare effects. I have also been asked to provide my own estimates of price effects and deadweight loss from the Transaction, and to compare the deadweight loss estimates to the efficiencies quantified in the Expert Report of Andrew Harington ("Harington Report").[2]

2. I have prepared this report with the assistance of other professionals under my direction and supervision. The Brattle Group ("Brattle") is being compensated for the time spent on this assignment at our customary hourly rates and is separately reimbursed for reasonable out-of-pocket expenses. No part of my or Brattle's compensation is dependent upon the outcome of this proceeding or the nature of the opinions that I express.

I.B. Qualifications

3. I am a Principal in the Toronto Office of Brattle, a multinational firm that provides economic, regulatory and financial consulting services. I am currently the leader of Brattle's Canadian Antitrust & Competition Practice. I possess a doctorate in economics from Northeastern University and a Masters in economics from Duke University.

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[1] Expert Report of Nathan H. Miller, Ph.D., Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, February 25, 2022 ("Miller Report").

[2] Expert Report of Andrew C. Harington, "Productive Efficiencies Arising from the Acquisition of Tervita Corporation," Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, March 25, 2022 ("Harington Report").

4. Prior to joining Brattle in June 2015, I was seconded to the Competition Bureau ("Bureau") for four years, initially as a Competition Law Officer in the Mergers Branch, then as the Special Economic Advisor in both the Mergers Branch and the Economic Policy and Enforcement Branch, and finally as the T.D. MacDonald Chair in Industrial Economics. As T.D. MacDonald Chair and Special Economic Advisor, I regularly provided the Commissioner of Competition, Senior Deputy Commissioners and others at the Bureau with advice, recommendations and strategic guidance on a wide variety of economic matters. I have extensive experience providing economic advice and analyses in competition-related matters, including in the context of mergers and acquisitions. During my time at the Bureau, I provided such advice and analyses to the Commissioner on behalf of the Bureau in respect of more than 30 mergers.

5. In particular, I was the economist assigned to the Bureau's case team in connection with its investigation into CCS Corporation's acquisition of Complete Environmental, Inc. and subsequently served as the Bureau's internal economist in *Commissioner of Competition v. CCS Corporation (Tervita)*. As the Bureau's internal economist I worked closely with the Bureau's outside expert and the case team on the economic implications of the merger. A list of other significant transactions in which I have provided analysis and advice to the Bureau is set out in my *curriculum vitae*, which is attached to this report as Appendix A.

6. While seconded to the Bureau, I testified on behalf of the Bureau before the Canadian Radio-television and Telecommunications Commission at the Broadcasting Notice of Consultation 2014-190 "Let's Talk TV" Hearing. During my secondment, I also authored and assisted with various reports on behalf of the Bureau, including authoring the Bureau's whitepaper on "Economic Analysis of Retail Mergers at the Competition Bureau" and assisting with the economic analysis and drafting of the 2014 Propane Market Review, a joint report to the Minister of Natural Resources and the Minister of Industry.

7. Prior to being seconded to the Bureau in October 2010, I was a senior economist at Microeconomics Consulting & Research Associates, Inc. (MiCRA). While at MiCRA, I was involved in the economic analysis of a wide range of competition matters, including mergers, cartels and abuse of dominance matters. Following my secondment with the Bureau, I returned to MiCRA as a Principal for a short time before joining Brattle.

8. In the course of my work at Brattle and MiCRA, I have provided expert economic advice and analyses to private sector clients in respect of mergers and acquisitions in Canada and the United States. For example, I provided economic advice and analyses to Superior Plus LP, BCE Inc., Agrium Inc., GFL Environmental Inc., and Cintas Corporation on Canadian-related matters and to Luxottica Group, Gannett Company Inc. and Motorola Inc. on US-related merger

matters. A list of these matters is also set out in my *curriculum vitae.* I also provided economic advice to numerous other private sector clients in respect of potential and completed transactions for which I do not have authorization to disclose. I also assisted with the economic analyses in competition matters on behalf of the United States Department of Justice and several state Attorneys General in respect of merger reviews.

9. The materials I have relied upon to prepare this report, including data and documents, are listed in Appendix B.

I.C. Summary of opinions

10. Dr. Nathan Miller, on behalf of the Commissioner, submitted an expert report that purports to assess the potential competitive implications of the Transaction and to estimate welfare effects from the Transaction. The methodologies that Dr. Miller uses to predict price and welfare effects from the Transaction suffer from several significant flaws that render them unreliable. As a result of these flaws, Dr. Miller substantially overstates his predicted price effects and welfare effects from the Transaction.

11. To estimate price effects, Dr. Miller employs a second-score auction model, which he describes as "a bargaining framework in which a waste service provider's price depends on the incremental value of its facility relative to what the next-best facility has to offer to a customer."[3] He claims this framework "reflects the structure of this industry."[4]

12. Dr. Miller's auction model is disconnected from the realities of what constrains pricing of waste disposal services to oil and gas producers in the Western Canadian sedimentary basin. For this reason, his predicted price increases are unreliable and substantially overstated.

13. In particular, Dr. Miller's model rests on an assumption that waste services facilities are significantly differentiated from one another from the customer's perspective, in ways that go beyond spatial/geographic differentiation, and that these facilities charge different prices in respect of each individual customer location. These are theoretical assumptions that are

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[3] Miller Report, ¶ 118. *See also*, Nathan H. Miller, "Modeling the Effects of Mergers in Procurement," *International Journal of Industrial Organization* 37(1) 2014: 201-208; and Nathan H. Miller, "Modeling the Effects of Mergers in Procurement: Addendum," February 19, 2017, http://www.nathanhmiller.org/SAM%20Addendum.pdf. The 2014 and 2017 Modeling the Effects of Mergers in Procurement papers by Nathan H. Miller are collectively referenced as "Dr. Miller's auction model paper" hereafter.

[4] Miller Report, ¶ 118.

impractical in reality, inconsistent with SECURE's pricing philosophy, and inconsistent with how customers actually pay for and use waste services facilities. Dr. Miller ignores the sophistication of customers, including their ability to discipline suppliers across product areas and geographies as part of the competitive process. Equally important, Dr. Miller's model also ignores the proven ability of buyers both to vertically integrate and sponsor entry. (See Section III.A.)

14. The price increases predicted by Dr. Miller's second-score auction model significantly exceed the price increases I estimate from a standard natural experiment analysis of the 2018 Tervita acquisition of Newalta Corporation ("Newalta") (the "Tervita/Newalta merger"). The Tervita/Newalta merger is a powerful natural experiment for assessing the price effects here, as it took place in the same industry, involved many of the same customers, and also involved consolidation in similar market structures. In reality, the Tervita/Newalta merger did not cause price increases on the order that Dr. Miller predicts for the current Transaction, which is contrary to the results from Dr. Miller's model. (See Section III.B.)

15. Tellingly, I apply Dr. Miller's auction model to the Tervita/Newalta merger and I find that Dr. Miller's model would have predicted significant price increases that did not occur in actuality. This is strong confirmation that his model does not fit the pricing dynamics at play in this industry. (See Section III.C.)

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.[5] 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. In particular, he calculates his facility closure effect based on the variable profits of facilities that SECURE has closed or plans to close as part of its integration plan, which he claims reflect the "value [oil and gas producers] derived from delivering wastes to that facility over other alternatives."[6] (See Section IV.A.)

17. Dr. Miller's facility closure effect methodology and analyses are flawed and unhelpful for assessing the impact of the Transaction. Critically, Dr. Miller's finding that there is a facility closure effect from closing profitable facilities ignores SECURE's profit-maximizing plan to shift waste services to other nearby facilities. In particular, under Dr. Miller's own price

[5] Throughout his report, Dr. Miller uses the terms social loss, welfare loss, loss of consumer choice, and deadweight loss largely interchangeably. Throughout my report, I will refer to his loss of consumer choice through facility closures as the "facility closure effect" and the loss of allocative efficiency (whereby a price increase brings about a negative resource allocation) as "deadweight loss."

[6] Miller Report, ¶ 148.

discrimination framework of his second-score auction model, SECURE would only choose to close facilities if its own profits (and thereby total surplus) were going to increase after the closure, not decrease. There is no reduction in customer volumes that are handled post-Transaction, and by shifting volumes SECURE realizes efficiencies at the absorbing facilities that Dr. Miller ignores. Dr. Keith Waehrer identified this flaw in a comment he issued on Dr. Miller's auction model paper.[7] This, alone, renders his facility closure effect analysis untenable. Relatedly, despite finding that the Parties' services are close substitutes (the central premise of the Commissioner's case), Dr. Miller necessarily relies on significant differentiation between the Parties – even between two facilities of the same party – in order to arrive at his facility closure effect. However, if there was such high differentiation in how customers "value" facilities, it would not be in SECURE's interests to close those facilities in the first place. (See Sections IV.B.1 and IV.B.2.)

18. I also understand from SECURE that the shifting of volume from closed facilities to remaining facilities is consistent with its approach to its ongoing integration plan, and I highlight several examples of quality improvements and cost reductions that I understand are being implemented at the remaining facilities that will benefit customers. (See IV.B.3)

19. Relatedly, Dr. Miller's asserted facility closure effect does not flow from the Commissioner's asserted competitive harm in the form of higher prices or any purported change in market power. Rather, the asserted facility closure effect flows strictly from SECURE's facility closures contemplated in its integration plan. (See IV.B.4)

20. Next, even if I were to accept for argument's sake that SECURE was irrationally closing facilities as Dr. Miller assumes, I explain why Dr. Miller's facility closure effect is substantially overestimated. In particular, Dr. Miller's facility-level variable margins are not an accurate representation of the lost consumer value. (See Section IV.C.)

21. Importantly, incremental transportation costs account for only a small component – less than 10% – of Dr. Miller's purported facility closure effect. This is inconsistent with the fact that Dr. Miller's report, customer witness statements, and documents in the record emphasize the importance of transportation costs in the industry as a determinant of pricing relative to a customer's alternatives. Transportation costs are the only observable component of the "value" Dr. Miller claims is reflected in facility variable margins. Indeed, the only direct cost incurred by customers resulting from SECURE's integration plan identified by Dr. Miller is higher

[7] Keith Waehrer, "Modeling the effects of mergers in procurement: Comment," September 9, 2021, https://waehrer.net/Comment_on_Miller__2014.pdf.

transportation costs for customers closest to closing facilities as they transition to other SECURE facilities that will accept their waste volumes. This evidence contradicts Dr. Miller's assertion that the variable margins at closed facilities are representative of lost consumer value. (See Section IV.C.1.)

22. The variable margins at closed facilities that form the basis of Dr. Miller's facility closure effect analysis are, in any event, not a true representation of consumer value lost from these closures, especially in this industry. Dr. Miller assumes that the variable margin of a facility represents its relative value to consumers of their next best options. In doing so, Dr. Miller ignores business realities that a facility's variable margin must contribute to overall firm fixed costs. In particular, the profitability of a facility must account for the lifetime costs of a facility, and these costs are beyond those accounted for by the variable profits in Dr. Miller's analysis and the fixed cost savings identified in the Harington Report. A waste service facility is not simply a nearby place to dispose of oilfield waste, but also a long-term risk manager of waste on behalf of those customers (who continue to bear long-term liability for this waste). Dr. Miller's model thus incorrectly assumes that the entire "value" generated by a facility will be lost as a result of the closure, when in fact customers will still be able to have all their waste managed by another facility providing the same services. Facility closures do not reduce the risk management value provided by SECURE. (See Section IV.C.2.)

23. Dr. Miller focusses on differentiation between individual facilities, which leads him to conclude that all value of a facility to a customer is lost when it closes. This ignores that this value may include "reputational value" that is not tied to a specific facility but to a specific company. To the extent that reputation is important – and some of this value is reflected in the variable facility margin that Dr. Miller claims – it will not be lost with facility closures as Dr. Miller claims. Oil and gas producers will continue to obtain waste services at nearby facilities, and these facilities will have the combined "reputational value" of SECURE and Tervita post-Transaction. (See Section IV.C.3.)

24. Finally, I turn my attention to a proper estimate of deadweight loss from the Transaction. Dr. Miller provides "illustrative calculations" of the deadweight loss that stems from predicted price increases and lower quantity demanded (although he does not estimate demand elasticity). While this methodology for estimating deadweight loss is standard, it is contradicted by his second-score auction model, because his model does not lead to a reduction in output or a deadweight loss. Specifically, Dr. Miller's auction model does not result in any deadweight loss from lower quantity demanded post-Transaction because in his model all transactions still occur post-Transaction, just at different prices. (See Section V.A.)

25. Per Counsel's request, I estimate the standard deadweight loss from the Transaction. I then compare the properly estimated standard deadweight loss, using Dr. Miller's relevant markets for illustration, to the efficiencies quantified in the Harington Report for the Transaction as a whole and in light of hypothetical Tribunal orders Counsel has asked me to consider. I find that the lost efficiencies from those potential orders significantly exceed any plausible estimate of deadweight loss. (See Sections V.B and V.D.)

26. Section II sets forth relevant industry background, before I elaborate on the opinions above in Sections III to V. Should new information become available to me after the date of this report, I reserve the right to update my analysis and/or opinions.

II. Background

II.A. SECURE

27. SECURE, headquartered in Calgary, Alberta, is a publicly traded company on the Toronto Stock Exchange (under the ticker symbol SES), that offers a diverse suite of midstream and environmental solutions to upstream oil and natural gas companies operating in Western Canada and within certain regions in the United States. For the year ending December 31, 2021, SECURE had $3.77 billion in consolidated total revenue and $204 million in consolidated net loss.[8] SECURE organizes its business into two segments: (1) Midstream Infrastructure; and (2) Environmental and Fluid Management.

28. SECURE's Midstream Infrastructure segment operates a network of midstream infrastructure assets throughout Western Canada, North Dakota, and Oklahoma that includes midstream processing and storage facilities, and crude oil and water pipelines.[9] Services include "clean oil terminalling and storage, crude oil marketing, pipeline transportation, custom treating of crude oil, produced and waste water disposal, oilfield waste processing, and oil purchase/resale

[8] SECURE, "Consolidated Financial Statements For the years ended December 31, 2021 and 2020," March 2022, p. 2, https://f.hubspotusercontent10.net/hubfs/6144363/pdfs/Q4%202021%20FS.pdf.

[9] SECURE, "Consolidated Financial Statements For the years ended December 31, 2021 and 2020," March 2022, p. 40, https://f.hubspotusercontent10.net/hubfs/6144363/pdfs/Q4%202021%20FS.pdf.

service."[10] For the year ending December 31, 2021, SECURE had $3.24 billion in total revenue in the Midstream Infrastructure segment.[11]

29. SECURE's Environmental and Fluid Management segment includes: the operation of industrial landfills, hazardous and non-hazardous waste management and disposal; bio-remediation and technologies, water treatment and recycling, emergency response, rail services, metal recycling services; a suite of comprehensive environmental management solutions to an array of customers; and fluid management for drilling, completion and production activities for oil and gas producers in Western Canada.[12] Services include disposal of oilfield and industrial solid wastes in SECURE's landfill network across Western Canada and North Dakota; project assessment and planning; environmental construction projects; demolition and decommissioning; and remediation and reclamation.[13] For the year ending December 31, 2021, SECURE had $525 million in total revenue in the Environmental and Fluid Management segment.[14]

II.B. Tervita

30. Prior to the Transaction, Tervita was a publicly traded company on the Toronto Stock Exchange (under the ticker symbol TEV) headquartered in Calgary, Alberta, which provided a diverse suite of environmental management solutions predominately for Western Canadian customers in the energy, industrial, and natural resource sectors. For the year ending December 31, 2020, Tervita had $1.4 billion in consolidated total revenue and a loss of $43 million in net profit.[15]

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[10] SECURE, "Consolidated Financial Statements For the years ended December 31, 2021 and 2020," March 2022, p. 40, https://f.hubspotusercontent10.net/hubfs/6144363/pdfs/Q4%202021%20FS.pdf.

[11] SECURE, "Consolidated Financial Statements For the years ended December 31, 2021 and 2020," March 2022, p. 41, https://f.hubspotusercontent10.net/hubfs/6144363/pdfs/Q4%202021%20FS.pdf.

[12] SECURE, "Consolidated Financial Statements For the years ended December 31, 2021 and 2020," March 2022, p. 40, https://f.hubspotusercontent10.net/hubfs/6144363/pdfs/Q4%202021%20FS.pdf; SECURE, "Consolidated Financial Statements For the years ended December 31, 2020 and 2019," February 2021, p. 40, https://f.hubspotusercontent10.net/hubfs/6144363/pdfs/secure-energy-2020-annual-financial-statements.pdf.

[13] SECURE, "Consolidated Financial Statements For the years ended December 31, 2020 and 2019," February 2021, p. 40, https://f.hubspotusercontent10.net/hubfs/6144363/pdfs/secure-energy-2020-annual-financial-statements.pdf.

[14] SECURE, "Consolidated Financial Statements For the years ended December 31, 2021 and 2020," March 2022, p. 41, https://f.hubspotusercontent10.net/hubfs/6144363/pdfs/Q4%202021%20FS.pdf.

[15] Tervita, "2020 – Tervita Corporation Annual Report," March 2021, p. 13, https://www.annualreports.com/HostedData/AnnualReports/PDF/TSX_TEV_2020.pdf.

Tervita's suite of solutions were offered through its two reportable segments: (1) Energy Services; and (2) Industrial Services.[16]

31. Tervita's Energy Services segment provided an array of services to the oil and gas sector through two service lines: (1) Facilities and (2) Energy Marketing. For the year ending December 31, 2020, Energy Services generated $1.2 billion in consolidated total revenue, of which Facilities represented $329 million in revenue, and Energy Marketing represented $875 million in revenue.[17]

32. Facilities included Tervita's Treatment, Recovery, and Disposal ("TRD") facilities, caverns, disposal wells, landfills, and onsite services. This represented "activities related to the treatment, recovery, and disposal of fluids, the processing and disposal of solid materials used in and generated by natural resource and industrial production, and the disposal of oilfield waste, as well as specialized services on a customer's site including centrifugation or other processes for heavy oil producers involved in mining and in-situ production."[18] Energy Marketing included Tervita's "activities related to the purchase and resale of oil volumes associated with terminalling, treatment, recovery, and disposal services."[19]

33. Tervita's Industrial Services segment provided an array of environmental solutions through four service lines: (1) Waste Services; (2) Metals Recycling and Rail Services; (3) Water Services; and (4) Environmental Services. For the year ending December 31, 2020, Industrial Services generated $220 million in consolidated total revenue.[20]

34. Waste Services included Tervita's collection, processing, and disposal of hazardous and non-hazardous waste.[21] To undertake these activities, Tervita utilized a network of facilities and a

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[16] In addition to the two reportable segments, Tervita also possessed a Corporate segment, which encapsulated intersegment eliminations, general and administrative expenses, the Canada Emergency Wage Subsidy, and other non-operating expenses. *See*, Tervita, "2020 – Tervita Corporation Annual Report," March 2021, p. 12, https://www.annualreports.com/HostedData/AnnualReports/PDF/TSX_TEV_2020.pdf.

[17] Tervita, "2020 – Tervita Corporation Annual Report," March 2021, p. 13, https://www.annualreports.com/HostedData/AnnualReports/PDF/TSX_TEV_2020.pdf.

[18] Tervita, "2020 – Tervita Corporation Annual Report," March 2021, p. 20, https://www.annualreports.com/HostedData/AnnualReports/PDF/TSX_TEV_2020.pdf.

[19] Tervita, "2020 – Tervita Corporation Annual Report," March 2021, p. 20, https://www.annualreports.com/HostedData/AnnualReports/PDF/TSX_TEV_2020.pdf.

[20] Tervita, "2020 – Tervita Corporation Annual Report," March 2021, p. 13, https://www.annualreports.com/HostedData/AnnualReports/PDF/TSX_TEV_2020.pdf.

[21] Tervita, "Tervita Corporation – Investor Presentation," December 2020, slide 23, https://tervita.com/files/public-files/tervita-events/tervita-december-2020-investor-presentation-2-2.pdf.

fleet of specialized trucks and containment bins to serve the oil and gas, industrial, commercial, maintenance, and manufacturing sectors.[22]

35. Metals Recycling and Rail Services included Tervita's purchase and resale of metals collected from demolition sites, operating oil production mines, and industrial facilities.[23] To undertake these activities, Tervita utilized rail connected facilities served by a fleet of heavy and specialist recycling equipment.[24]

36. Water Services included Tervita's suite of water treatment and management services including dredging and dewatering, filtration, and fluids recovery.[25] Tervita offered such services to various sectors including, among others, the oil sands, downstream and conventional production, construction, pulp and paper, drilling, mining, and pipeline construction.[26]

37. Environmental Services included Tervita's remediation and environmental construction, demolition and decommissioning, mill services, bioremediation facilities, and sulphur services.[27]

38. "On July 2, 2021, pursuant to a plan of arrangement under the Business Corporations Act (Alberta), SECURE acquired all issued and outstanding common shares of Tervita."[28] Subsequently, Tervita was amalgamated with SECURE and continues to operate as SECURE.[29]

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[22] Tervita, "Tervita Corporation – Investor Presentation," December 2020, slide 39, https://tervita.com/files/public-files/tervita-events/tervita-december-2020-investor-presentation-2-2.pdf.

[23] Tervita, "Tervita Corporation – Investor Presentation," December 2020, slide 23, https://tervita.com/files/public-files/tervita-events/tervita-december-2020-investor-presentation-2-2.pdf.

[24] Tervita, "Tervita Corporation – Investor Presentation," December 2020, slide 37, https://tervita.com/files/public-files/tervita-events/tervita-december-2020-investor-presentation-2-2.pdf.

[25] Tervita, "Tervita Corporation – Investor Presentation," December 2020, slide 23, https://tervita.com/files/public-files/tervita-events/tervita-december-2020-investor-presentation-2-2.pdf.

[26] Tervita, "Tervita Corporation – Investor Presentation," December 2020, slide 41, https://tervita.com/files/public-files/tervita-events/tervita-december-2020-investor-presentation-2-2.pdf.

[27] Tervita, "Tervita Corporation – Investor Presentation," December 2020, slide 23, https://tervita.com/files/public-files/tervita-events/tervita-december-2020-investor-presentation-2-2.pdf.

[28] SECURE, "Condensed Consolidated Financial Statements for the three and nine months ended September 30, 2021," p. 5, https://f.hubspotusercontent10.net/hubfs/6144363/pdfs/secure-energy-q3-2021-financial-statements.pdf.

[29] SECURE, "SECURE Energy Services Inc. completes merger with Tervita Corporation," *News Release*, July 2, 2021, https://secure-energy.mediaroom.com/2021-07-02-SECURE-Energy-Services-Inc-completes-merger-with-Tervita-Corporation.

Tervita previously acquired Newalta on July 19, 2018.[30] The Commissioner did not challenge that transaction.[31]

II.C. Industry background

II.C.1. Oil and gas production

39. Canada has an endowment of crude oil and natural gas resources predominately situated in the Western Canada Sedimentary Basin ("WCSB").[32] The oil and gas sector is a significant contributor to Canada's economy, particularly in Western Canada.[33]

40. The oil and gas sector supply chain is typically divided into three components: (1) upstream; (2) midstream; and (3) downstream. The upstream portion of the supply chain, sometimes referred to as the exploration and production sector, finds and produces crude oil and natural gas.[34] The midstream portion of the chain typically processes, stores, markets and transports commodities such as crude oil, natural gas, natural gas liquids and sulphur, and provides the necessary link between the upstream and the downstream portion of the supply chain.[35] The downstream portion of the supply chain includes oil refineries, petrochemical plants, petroleum products distributors, retail outlets and natural gas distribution companies.[36]

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30 Tervita, "Tervita and Newalta Announce Completion of Merger," July 19, 2018, https://tervita.com/news/article/tervita-and-newalta-announce-completion-of-merger/.

31 Tervita, "Tervita Corporation Announces End of Competition Bureau Review Period for the Newalta Transaction," July 22, 2019, https://tervita.com/news/article/tervita-corporation-announces-end-of-competition-bureau-review-p/.

32 Robert D. Bott, "Evolution of Canada's oil and gas industry," *Canadian Centre for Energy Information*, 2004, p. 5, http://www.energybc.ca/cache/oil/www.centreforenergy.com/shopping/uploads/122.pdf.

33 Government of Alberta, "Alberta's Oil and Gas Industry," https://open.alberta.ca/dataset/5344b223-8acd-4aa1-b249-e2ac46e1025b/resource/3f92ee7f-92a9-47d1-b840-fde7bb70d009/download/2011-08-albertas-oil-and-gas-factsheet-w.pdf. From the year 2000 onwards, the gross domestic product share of oil and gas extraction in the total economy averaged about 5% for Canada overall and, as well as 21% for Alberta. *See,* Weiwin Wang, "The oil and gas sector in Canada: A year after the start of the pandemic," July 2021, p. 2, https://www150.statcan.gc.ca/n1/pub/36-28-0001/2021007/article/00003-eng.htm.

34 Petroleum Services Association of Canada, "Oil & Gas Industry Overview," https://www.psac.ca/business/oil-and-gas-industry-overview/.

35 Petroleum Services Association of Canada, "Oil & Gas Industry Overview," https://www.psac.ca/business/oil-and-gas-industry-overview/.

36 Petroleum Services Association of Canada, "Oil & Gas Industry Overview," https://www.psac.ca/business/oil-and-gas-industry-overview/.

41. Oil production generates waste as a by-product at one or more stages throughout a project's lifecycle ranging from project initiation to construction, operation, and finally closure.[37] Oil production companies are required to manage their oilfield waste, which can include a variety of unwanted substances or mixture of substances, at every stage throughout the project lifecycle.[38] These oil and gas companies, which are the customers of Tervita and SECURE, are often large and sophisticated companies with locations all throughout the WCSB. Their business focusses on finding and producing crude oil and natural gas and bringing those products to market through oil refineries, gas plants, retail outlets and the like. Through the production process, they produce various forms of oilfield waste (described below) that must be disposed of in facilities in accordance with certain regulations. Some oilfield waste is disposed of by oil and gas producers in their own facilities, while other waste is handled by third parties such as SECURE and Tervita.

42. Figure 1 below identifies SECURE and Tervita's top 10 customers in 2019.[39]

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[37] *See*, Alberta Energy Regulator, "Waste Management," https://www.aer.ca/providing-information/by-topic/waste-management; and Alberta Energy Regulator, "Project Life Cycle," https://www.aer.ca/protecting-what-matters/holding-industry-accountable/how-does-the-aer-regulate-energy-development-in-alberta/project-life-cycle.

[38] For example, oilfield waste can include unwanted substance(s) or mixture of substances including, among others, used filters, contaminated debris and soil, wash water, drilling mud cuttings, hydraulic fracturing flowback fluid, contaminated hydrovac material, and sediment from storage tanks. *See,* Alberta Energy Regulator, "Waste Management," https://www.aer.ca/providing-information/by-topic/waste-management.

[39] [redacted]

FIGURE 1: SECURE AND TERVITA TOP 10 CUSTOMERS BY REVENUE, 2019

Sources:

Miller Transactions Data, replicated through 15_build_secure_transaction_data_distances.R and 16_build_tervita_transaction_data_distances.R.[40]

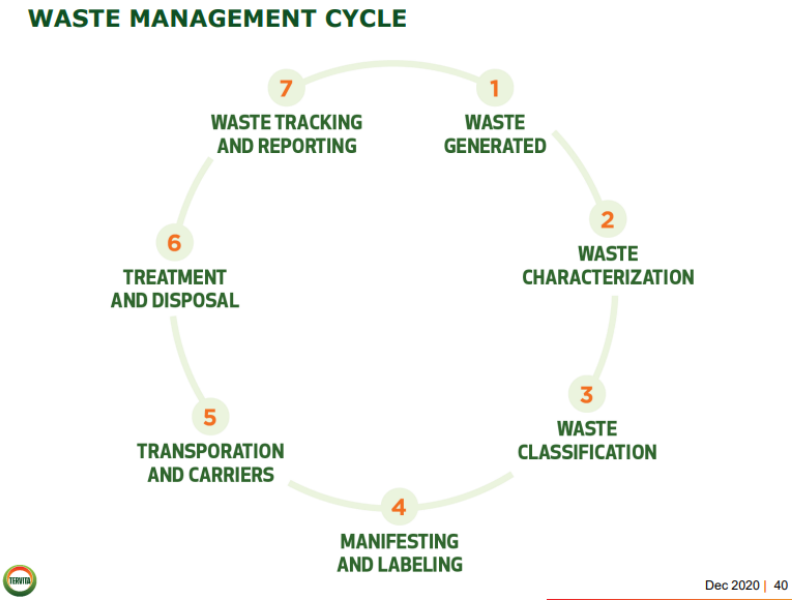
II.C.2. Waste services for oil and gas producers

43. Due to the diverse set of activities in the project lifecycle, the type of oilfield waste generated, as well as the requirements to handle, store, treat and dispose of oilfield waste, waste services encompass a broad set of activities.[41] Figure 2 broadly illustrates the waste management cycle.

[40] Throughout my analysis, I rely on the datasets constructed by Dr. Miller in his analysis, which I replicate using his produced backup materials. Dr. Miller draws on several sources to construct these datasets, and his backup materials consist of numerous code files that must be run in sequence to prepare and combine these sources into the constructed datasets. *See,* Miller Report, Appendix Section 7.7, the sources to his Exhibits, and his backup materials for additional detail. For clarity, where I rely on replications of Dr. Miller's datasets, I refer to these as "Miller Transactions Data, replicated through [program(s)]," where [program(s)] indicates the final step (or steps) in his backup materials that produces the dataset(s) I take as inputs into my analysis.

[41] Alberta Energy Regulator, "Waste Management," https://www.aer.ca/providing-information/by-topic/waste-management.

FIGURE 2: ILLUSTRATION OF THE WASTE CYCLE



Sources:

Tervita, "Tervita Corporation – Investor Presentation," December 2020, slide 40, https://tervita.com/files/public-files/tervita-events/tervita-december-2020-investor-presentation-2-2.pdf.

44. Waste service providers, such as SECURE and Tervita, utilize their infrastructure assets to offer collection, processing, and disposal of hazardous and non-hazardous waste streams and other by-products that are associated with activity in the oil sands to these large oil and gas companies.

45. The service of a waste service provider does not end when the customer deposits the waste. The liability of that waste remains with the customer, so if there is a failure at the waste disposal facility and waste begins to seep into the environment, the customers who disposed of their waste would be responsible.[42]

46. As part of their waste service activities, the Parties each possess a network of facilities for various oilfield waste services, including TRDs (or Full Service Terminal ("FST")) facilities; (2) landfills; and (3) water disposal wells. I discuss each of these facilities next.

[42] Affidavit of David Engel, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, March 25, 2022 ("Engel Affidavit"), ¶ 81; Affidavit of Chris Hogue, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, March 24, 2022, ¶ 11; Affidavit of Robert Broen, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, March 24, 2022, ¶ 31.

II.C.2.a. TRD and FST Facilities

47. Tervita's TRD facilities and SECURE's FST facilities are comparable full-service facilities offering a similar range of waste services. TRDs and FSTs separate waste water and waste solids into various components like reclaimed oil, waste water and residual solids, while recovering oil from petroleum wastes and can handle the complete spectrum of petroleum industry waste products.[43]

48. TRD/FST facilities operate by cleaning (1) oil or oil that requires treatment, and (2) oilfield waste. With respect to oil or oil that requires treatment, TRD/FST facilities process the oil/water emulsion (delivered to the TRD/FST facility by pipeline or tank truck), resulting in pipeline specification oil which is injected into a gathering or transmission pipeline, and clean produced water which is injected into a disposal well.[44] With respect to oilfield waste, TRD/FST facilities separate the oilfield waste (delivered to the TRD/FST facility by vacuum truck) into (1) reclaimed oil which is injected into a gathering or transmission pipeline, (2) waste water which is injected into a disposal well, and (3) residual solids which are treated and disposed of at a landfill.[45] Due to these operations, TRD/FST facilities are typically connected to an oil gathering or transmission pipeline as well as disposal wells.[46] Figure 3 below presents a graphical presentation of how TRD/FST facilities operate.[47]

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[43] *See*, Tervita, "Tervita Corporation – Investor Presentation," December 2020, slide 31, https://tervita.com/files/public-files/tervita-events/tervita-december-2020-investor-presentation-2-2.pdf; and Tervita, "Treatment Recovery & Disposal," https://tervita.com/solutions/treatment-recovery-and-disposal/, accessed on March 15, 2022. The hyperlink for "Treatment Recovery & Disposal" is no longer available, and as a result, see the hyperlink produced by the Wayback Machine: https://web.archive.org/web/20210509222645/https://tervita.com/solutions/treatment-recovery-and-disposal/; and SECURE, "SECURE Energy – Annual Information Form – For the year ended December 31, 2020," February 25, 2021, p. 20, https://f.hubspotusercontent10.net/hubfs/6144363/pdfs/secure-energy-2020-aif.pdf.

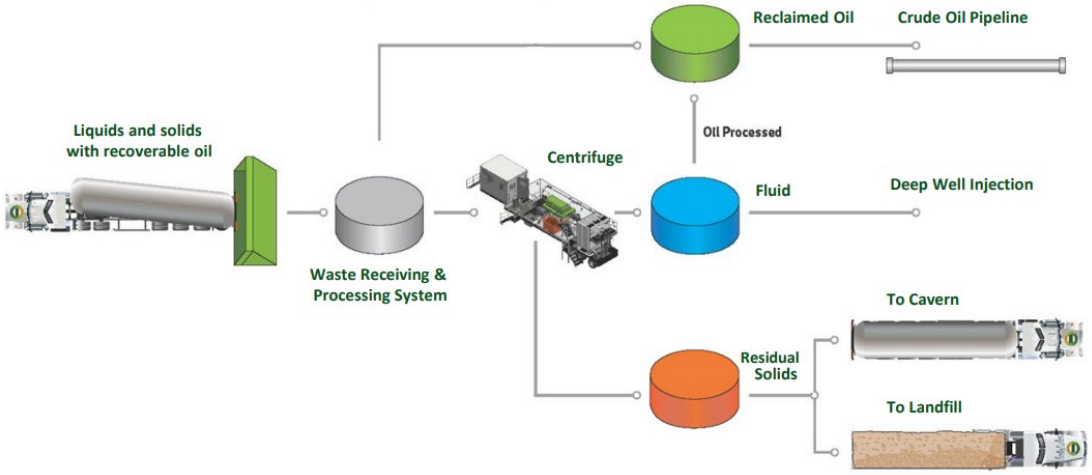
[44] SECURE, "SECURE Energy – Annual Information Form – For the year ended December 31, 2020," February 25, 2021, p. 20, https://f.hubspotusercontent10.net/hubfs/6144363/pdfs/secure-energy-2020-aif.pdf.

[45] SECURE, "SECURE Energy – Annual Information Form – For the year ended December 31, 2020," February 25, 2021, p. 20, https://f.hubspotusercontent10.net/hubfs/6144363/pdfs/secure-energy-2020-aif.pdf.

[46] SECURE, "SECURE Energy – Annual Information Form – For the year ended December 31, 2020," February 25, 2021, p. 19, https://f.hubspotusercontent10.net/hubfs/6144363/pdfs/secure-energy-2020-aif.pdf.

[47] A centrifuge is a segment of a processing component in a facility, which separates the oilfield waste products into three streams: (1) hydrocarbons; (2) waste water; and (3) solids. Tervita, "Treatment Recovery & Disposal," https://tervita.com/solutions/treatment-recovery-and-disposal/, accessed on March 15, 2022. The hyperlink for "Treatment Recovery & Disposal" is no longer available, and as a result, see the hyperlink produced by the Wayback Machine: https://web.archive.org/web/20210509222645/https://tervita.com/solutions/treatment-recovery-and-disposal/.

FIGURE 3: ILLUSTRATION OF TRD/FST OPERATIONS



Sources:

Tervita, "Tervita Corporation – Investor Presentation," December 2020, slide 31, https://tervita.com/files/public-files/tervita-events/tervita-december-2020-investor-presentation-2-2.pdf.

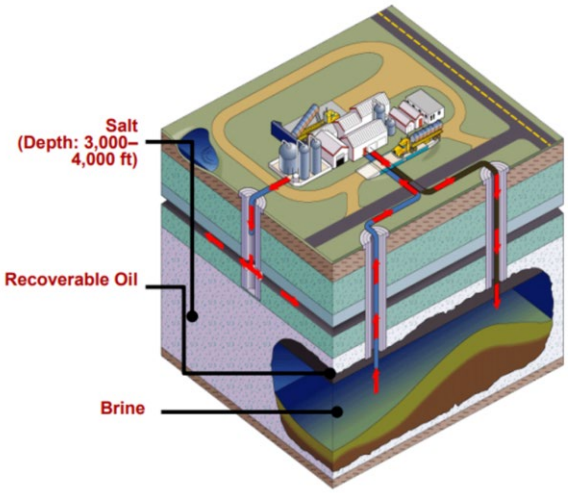
49. In addition to TRD facilities, Tervita also possessed Cavern Disposal ("Cavern") facilities for secure disposal of fluids and certain solids, as well as additional waste types that traditional TRDs cannot process.[48] Figure 4 below illustrates a Tervita Cavern. Caverns operate by unloading wastes into mixing tanks where the waste is blended with brine water to make a slurry, and subsequently the slurry is pumped into a cavern for disposal.[49] Overtime the crude oil is separated from the waste through gravity and heat, and eventually extracted and sold.[50]

[48] These include, among others, high pH fluids, chemicals, Naturally Occurring Radioactive Material ("NORM") disposal, and processed sludges and other contaminates. *See,* Tervita, "Tervita Corporation – Investor Presentation," December 2020, slide 32, https://tervita.com/files/public-files/tervita-events/tervita-december-2020-investor-presentation-2-2.pdf.

[49] Tervita, "Tervita Corporation – Investor Presentation," December 2020, slide 32, https://tervita.com/files/public-files/tervita-events/tervita-december-2020-investor-presentation-2-2.pdf.

[50] Tervita, "Tervita Corporation – Investor Presentation," December 2020, slide 32, https://tervita.com/files/public-files/tervita-events/tervita-december-2020-investor-presentation-2-2.pdf.

FIGURE 4: ILLUSTRATION OF A CAVERN



Sources:

Tervita, "Tervita Corporation – Investor Presentation," December 2020, slide 32, https://tervita.com/files/public-files/tervita-events/tervita-december-2020-investor-presentation-2-2.pdf.

50. Tervita possessed three Cavern facilities in Western Canada: (1) Hughenden (Alberta); (2) Lindbergh (Alberta); and (3) Unity (Saskatchewan).[51] In Dr. Miller's expert report, he notes "caverns are considered to be potential sources of competition in all three product markets" (i.e., landfills, and waste water wells).[52]

II.C.2.b. Landfill Facilities

51. The Parties each operate Class II[53] Landfill ("LF") facilities that provide disposal of contaminated soil and drill cuttings associated with oil and natural gas drilling, production and reclamation activities, as well as disposal of waste solids that were separated from liquid waste at FST facilities.[54] Class II LFs are located on land that meet stringent geological standards, and are constructed with a variety of features including, among others, a multi-layer containment barrier consisting of high-density polyethylene for primary containment and an engineered clay

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51 Tervita, "Tervita Facilities," January 2020, pp. 5-8, https://tervita.com/files/public-files/20200120-facility-network-8-5x11-v32.pdf.

52 Miller Report, footnote 108.

53 Class II LFs do not accept municipal, hazardous, dangerous or construction waste. *See*, SECURE, "SECURE Energy – Annual Information Form – For the year ended December 31, 2020," February 2021, p. 23, https://f.hubspotusercontent10.net/hubfs/6144363/pdfs/secure-energy-2020-aif.pdf.

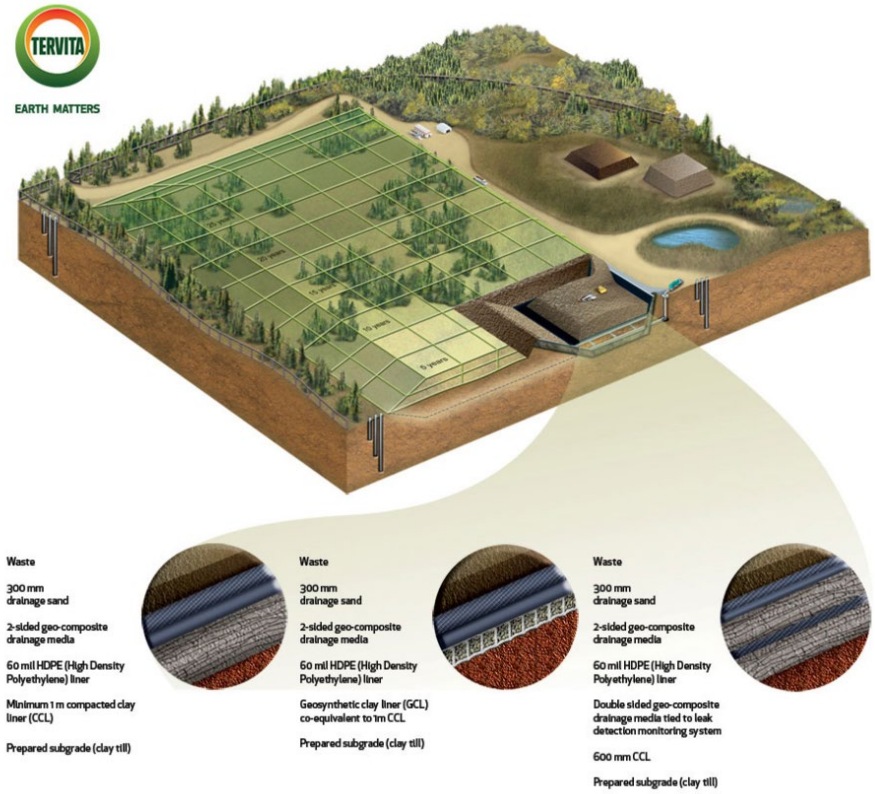
54 SECURE, "SECURE Energy – Annual Information Form – For the year ended December 31, 2020," February 2021, p. 23, https://f.hubspotusercontent10.net/hubfs/6144363/pdfs/secure-energy-2020-aif.pdf.

liner for secondary containment, in-cell leachate collection and removal systems and disposal, groundwater monitoring, and surface run-on and run-off controls.[55] In addition to Class II LFs, SECURE's Pembina Area LF also has a separate Class I landfill cell (e.g., constructed with three liners and contains additional monitoring requirements) that is approved for naturally occurring radioactive material ("NORM") disposal, enabling SECURE to dispose of hazardous industrial solids and dangerous oilfield waste.[56] Figure 5 illustrates a LF and example of its construction components.

[55] *See*, SECURE, "SECURE Energy – Annual Information Form – For the year ended December 31, 2020," February 2021, p. 23, https://f.hubspotusercontent10.net/hubfs/6144363/pdfs/secure-energy-2020-aif.pdf; and Tervita, "Engineered Landfill Disposal," https://tervita.com/solutions/engineered-landfill-disposal/, accessed March 15, 2022. The hyperlink for "Engineered Landfill Disposal" is no longer available, and as a result, see the hyperlink produced by the Wayback Machine: https://web.archive.org/web/20210509222313/https://tervita.com/solutions/engineered-landfill-disposal/.

[56] SECURE, "SECURE Energy – Annual Information Form – For the year ended December 31, 2020," February 2021, p. 23, https://f.hubspotusercontent10.net/hubfs/6144363/pdfs/secure-energy-2020-aif.pdf. I understand that "Tervita's Silverberry Landfill is also, to a certain extent, able to accept solid waste contaminated by… [NORMs]." *See*, for example, Engel Affidavit, ¶¶ 4 and 50.

FIGURE 5: ILLUSTRATION OF A LANDFILL



Sources:

Tervita, "Engineered Landfill Disposal," https://tervita.com/solutions/engineered-landfill-disposal/, accessed March 15, 2022. The hyperlink for "Engineered Landfill Disposal" is no longer available, and as a result, see the hyperlink produced by the Wayback Machine: https://web.archive.org/web/20210509222313/https://tervita.com/solutions/engineered-landfill-disposal/.

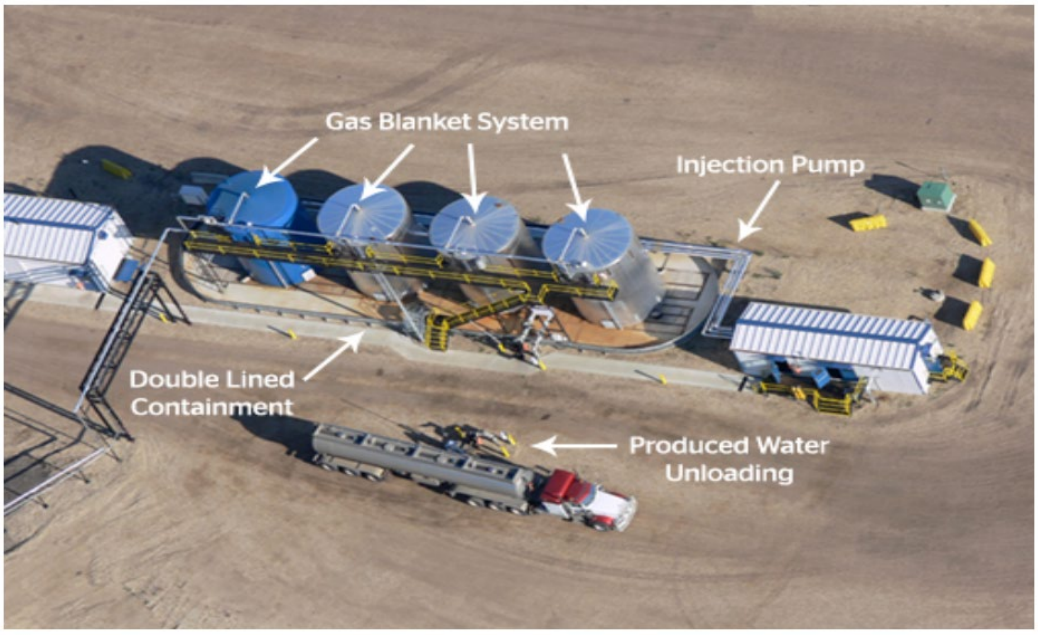
II.C.2.c. Water Disposal Facilities

52. Each of the Parties' Water Disposal ("WD") facilities provides disposal of produced and waste water through a disposal well into a non-hydrocarbon producing zone, ranging between 1,300 and 4,600 meters below the surface.[57] Disposal wells are classified as either Class II or Class IB, the former are permitted to dispose of saltwaters that are a by-product of oil and natural gas production, while the latter can accept Class II fluids plus additional specific common oilfield

[57] Produced water is a by-product of crude oil and natural gas exploration. On the other hand, waste water is a by-product "typically associated with oil and natural gas well drilling and completion activities as well as production related to well work-overs." *See*, SECURE, "SECURE Energy – Annual Information Form – For the year ended December 31, 2020," February 2021, p. 22, https://f.hubspotusercontent10.net/hubfs/6144363/pdfs/secure-energy-2020-aif.pdf.

waste streams that are produced during drilling, completion and production operations.[58] Figure 6 below shows an aerial photograph of SECURE's Emerson WD facility.[59] A WD facility typically operates as follows: (1) produced and waste water is delivered to a WD facility by tank truck; (2) produced and waste water is temporarily stored in tanks prior to being filtered to remove any suspended solids and crude oil; and (3) the treated water is injected into the disposal well.[60]

FIGURE 6: ILLUSTRATION OF A WD FACILITY



Sources:

SECURE, "SECURE Energy – Annual Information Form – For the year ended December 31, 2020," February 2021, p. 22, https://f.hubspotusercontent10.net/hubfs/6144363/pdfs/secure-energy-2020-aif.pdf.

[58] SECURE, "SECURE Energy – Annual Information Form – For the year ended December 31, 2020," February 2021, p. 22, https://f.hubspotusercontent10.net/hubfs/6144363/pdfs/secure-energy-2020-aif.pdf.

[59] SECURE, "SECURE Energy – Annual Information Form – For the year ended December 31, 2020," February 2021, p. 22, https://f.hubspotusercontent10.net/hubfs/6144363/pdfs/secure-energy-2020-aif.pdf.

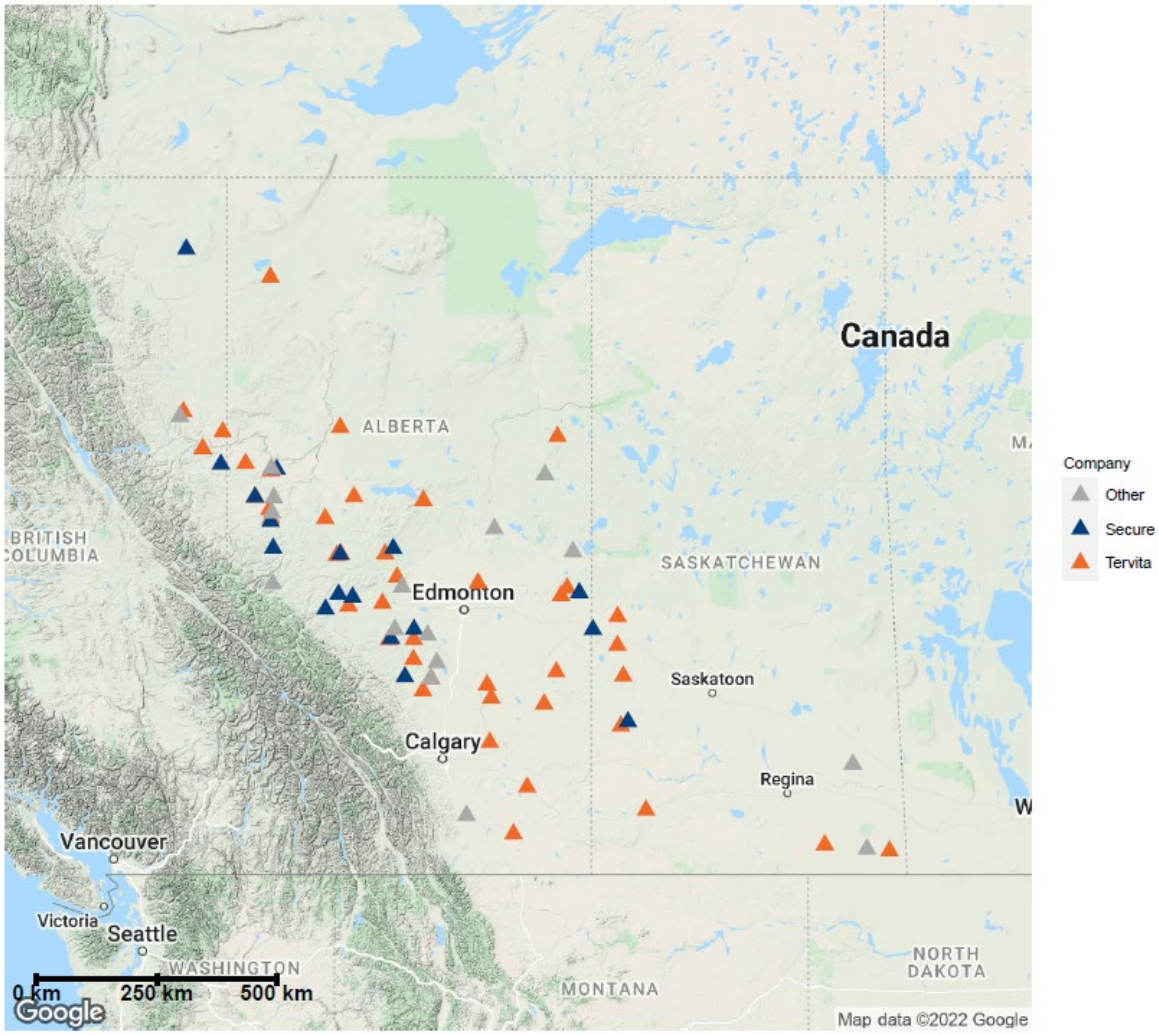
[60] SECURE, "SECURE Energy – Annual Information Form – For the year ended December 31, 2020," February 2021, p. 22, https://f.hubspotusercontent10.net/hubfs/6144363/pdfs/secure-energy-2020-aif.pdf.

II.C.2.d. Facilities in Western Canada

53. Figure 7 (TRD/FSTs), Figure 8 (LFs), and Figure 9 (WDs) below plot each of the Parties' and competitor locations in Western Canada, including "first-party" facilities (meaning those operated by vertically integrated oil and gas producers that also have waste disposal facilities).[61]

[61] Given the size and scope of each of the different types of waste service facilities, a facility may be a stand-alone location or it may be connected/at the same location of another facility type. For example, as noted above, the majority of SECURE's FST facilities are connected to a Class IB disposal well for the disposal of produced and waste water (e.g., SECURE's Drayton Valley FST facility has three disposal wells located within approximately a kilometre of the FST facility). Similarly, a location may have both a FST and LF facility (e.g., SECURE's South Grande Prairie location). *See*, SECURE, "SECURE Energy – Annual Information Form – For the year ended December 31, 2020," February 2021, pp. 19-20 and 25-27, https://f.hubspotusercontent10.net/hubfs/6144363/pdfs/secure-energy-2020-aif.pdf. Figure 7, Figure 8, and Figure 9, follow the facility list and mapping approach found in Exhibits 1-3 of Dr. Miller's Report including, for example, cavern facilities are mapped among TRD/FST, WD, and LF facilities, and mapped WD facilities also include waste water disposal facilities available at TRDs/FSTs, which also take in produced water and waste water. *See*, Miller Report, Exhibits 1-3.

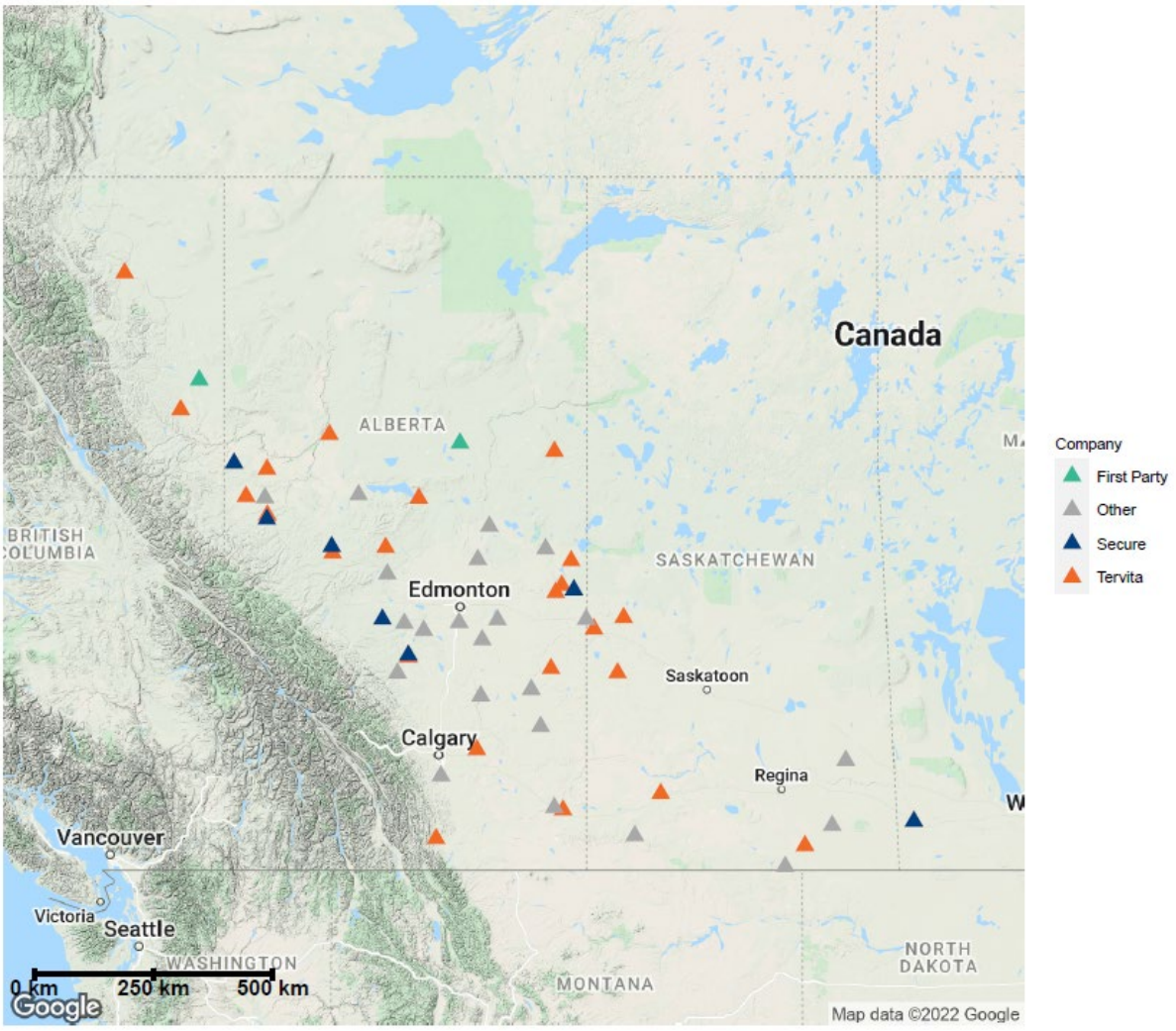
FIGURE 7: TRD/FST FACILITIES IN WESTERN CANADA



Sources:

See my backup, “Facility History.xlsx”; Miller Report backup, “Masterlist.xlsx” and “first_party_data.csv”; RBBA00004_000000338; “PROTECTED & CONFIDENTIAL Facility List - FINAL - 05282021 (1).xlsx”; “4 210422 - Revenues and Volumes.xlsx”; and Miller Transactions Data, replicated through 11_build_secure_transaction_data_coordinates.R and 12_build_tervita_transaction_data_coordinates.R.

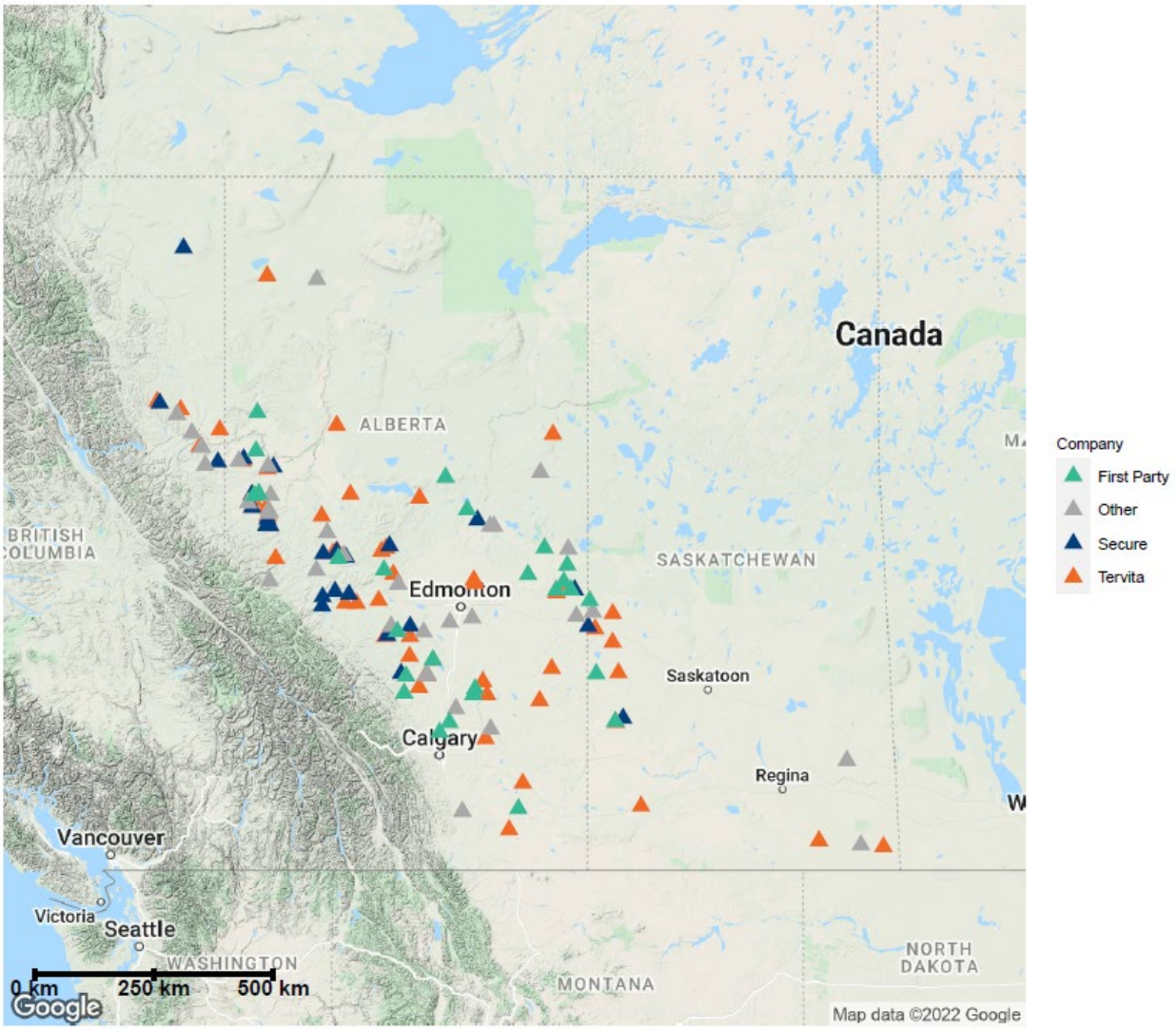
FIGURE 8: LF FACILITIES IN WESTERN CANADA



Sources:

See my backup, “Facility History.xlsx”; Miller Report backup, “Masterlist.xlsx” and “first_party_data.csv”; RBBA00004_000000338; “PROTECTED & CONFIDENTIAL Facility List - FINAL - 05282021 (1).xlsx”; “4 210422 - Revenues and Volumes.xlsx”; and Miller Transactions Data, replicated through 11_build_secure_transaction_data_coordinates.R and 12_build_tervita_transaction_data_coordinates.R.

FIGURE 9: WD FACILITIES IN WESTERN CANADA



Sources:

See my backup, “Facility History.xlsx”; Miller Report backup, “Masterlist.xlsx” and “first_party_data.csv”; RBBA00004_000000338; “PROTECTED & CONFIDENTIAL Facility List - FINAL - 05282021 (1).xlsx”; “4 210422 - Revenues and Volumes.xlsx”; and Miller Transactions Data, replicated through 11_build_secure_transaction_data_coordinates.R and 12_build_tervita_transaction_data_coordinates.R.

III. Dr. Miller's asserted price effects are unreliable and overstated

54. In this section, I explain why Dr. Miller's second-score auction model is disconnected from the realities of what constrains pricing of waste disposal services for oil and gas producers. For this reason, his predicted price increases are unreliable and overstated. This section proceeds as follows. First, I explain why Dr. Miller's second-score auction model is incapable of capturing actual pricing practices or constraints. In particular, his assumptions regarding facility differentiation and price discrimination are unrealistic and inconsistent with the evidence, and do not appropriately account for the power of customers.

55. Second, I explain that a standard natural experiment analysis of the recent Tervita/Newalta merger, which is a powerful natural experiment for assessing the effects here, shows that low price effects materialized from that merger in similar circumstances. This confirms that Dr. Miller's second-score auction model does not appropriately capture real-world pricing constraints and is not reflective of likely competitive effects from the Transaction.

56. Third, I show that Dr. Miller's second-score auction model would have produced high price effects if applied to the Tervita/Newalta merger that did not occur, which is further confirmation that his model is not appropriate.

III.A. Dr. Miller's second-score auction model is incapable of capturing actual pricing dynamics or constraints on suppliers

III.A.1. Dr. Miller's model and its premise

57. To estimate the price effects from the Transaction, Dr. Miller uses a second-score auction model, which as he describes is "a bargaining framework in which a waste service provider's price depends on the incremental value of its facility relative to what the next-best facility has

to offer to a customer."[62] In this model, "the Parties consider the locations of alternative facilities that a customer may use and set their prices accordingly."[63] Dr. Miller's model assumes that waste service suppliers can perfectly price discriminate. He notes, in particular, "[p]rice discrimination is feasible when sellers can identify targeted customers based on their observable characteristics (e.g., location) and targeted customers cannot switch easily to other suppliers in response (e.g., due to transportation costs) and cannot engage in arbitrage."[64]

58. He claims this framework "reflects the structure of this industry."[65] On that basis, he simulates the Transaction using a second-score auction model and predicts price effects at an individual customer-well location level that range, on average by facility type and market structure, from 10.5% to 51.7%.[66]

III.A.2. Dr. Miller's model requires unrealistic assumptions about differentiation of waste services facilities and their ability to price discriminate

59. Dr. Miller's second-score auction model is not a realistic representation of how prices are set in the waste services industry, and as a result, it cannot accurately predict the Transaction's price effects. He assumes (and his model reflects) that waste services facilities are significantly differentiated from one another from the customer's perspective (even those of the same company), and that these facilities can price discriminate by charging different prices to individual customer locations. He also assumes that facilities have all the bargaining power in negotiations with customers. Dr. Miller makes these strong assumptions in order to justify, for purposes of his theoretical model, the profits that facilities earn. In Dr. Miller's model, positive profits for a facility (after covering fixed and variable costs) come from the differentiation of waste services facilities and their ability to price discriminate across individual customer locations.

60. These are highly theoretical assumptions that are impractical in reality, inconsistent with SECURE's pricing philosophy, and inconsistent with how customers actually pay for and use

[62] Miller Report, ¶ 118.
[63] Miller Report, ¶ 118.
[64] Miller Report, ¶ 71.
[65] Miller Report, ¶ 118.
[66] Miller Report, Exhibit 21.

waste services facilities (most notably that customers often use multiple facilities interchangeably).

61. Dr. Miller observes that SECURE facilities are generally profitable, and for that to be the case in his model the profits must be derived from the facility's ability to extract from the customer the full amount that the customer values the facility over its next best option. However, as I will explain in detail later in this report, this is not what a facility's margin represents in reality. A facility's profits must cover more than just variable costs and facility-level fixed cost savings quantified in the Harington Report.[67] They must also cover what Mr. Harington refers to as "lifetime" capital costs, which reflect the reality that waste services do not end when a customer drops off waste but continue over the lifecycle of the waste.

62. Price discrimination of the sort Dr. Miller models is impractical. For one, SECURE and Tervita customers often have many well locations from which they deliver waste to the Parties' facilities, and as noted in the Engel Affidavit, "customers do not necessarily negotiate different prices for waste from each of their well locations for disposal at our facilities."[68] The business reality is that some customers negotiate prices across many well locations for delivery to one or many waste services facilities.[69]

63. Another reason it is impractical for waste services providers to price discriminate separately for each individual customer well location as Dr. Miller assumes is that waste services providers cannot observe how each customer values one facility relative to other options for each of its well locations, aside from perhaps distance and associated transportation cost differentials.[70]

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[67] In Section IV.C.2, I discuss that variable profits must cover more than the fixed cost savings quantified in the Harington Report.

[68] Engel Affidavit, ¶ 56.

[69] Engel Affidavit, ¶ 56. *See*, for example, [redacted]

[70] Dr. Miller's model relies on the so-called "revelation principle" from auction theory, which states that "efficient auctions" can be designed in a way that makes it individually rational and incentive compatible for suppliers to elicit "truth telling", and have suppliers "reveal" (directly or otherwise) their cost structure to buyers. *See*, e.g., Vijay Krishna, *Auction Theory*, "Chapter 5: Mechanism Design," 2nd Ed., Oxford: Elsevier, 2009, pp. 61-83. However, the second-score framework envisioned by Dr. Miller, whereby prospective suppliers submit bids (including both the price required as well as the various product attributes that will be

While distance and transportation costs are readily observable and quantifiable, other factors that Dr. Miller claims affect customer facility choice are not observable, let alone quantifiable.[71] Indeed, Dr. Miller only attempts to individually quantify the increase in transportation costs component of his claimed facility closure effect which calls into question whether the rest of his facility closure effect could reflect customer value at all (as I discuss in detail below in Section IV.C.1).

64. Dr. Miller's model does not reflect how SECURE operates. [redacted][74]

SECURE's pricing philosophy is broadly inconsistent with Dr. Miller's model. [redacted]

provided) that can be "scored" under a known set of criteria, does not accurately represent the marketplace realities of waste-disposal services. For example, while distances between the customer location and competing facilities may be estimable, a supplier cannot observe and thus reasonably assess how it will be scored in terms of any other dimensions that a customer may value.

71 Dr. Miller notes that other factors can affect how oil and gas producers value facilities, such as wait times to unload waste, available capacity, and types of waste accepted, among other potential factors. However, Dr. Miller does not explain how any of these can be observed and quantified by waste-service providers. *See*, e.g., Miller Report, ¶ 123.

72 *See*, for example, [redacted]

73 Engel Affidavit, ¶ 54. *See*, for example, [redacted].

74 [redacted]

[redacted][75] However, it is not clear how Tervita could have price discriminated with regard to other factors to extract the full surplus from customer negotiations, nor has Dr. Miller pointed to any evidence of this.

65. As noted above, Dr. Miller's model assumes that each customer well location has different value for the waste services facilities it may visit and as a result pays different prices. He refers to "economic theory of revealed preferences," noting that "observing an agent that chooses one alternative over another indicates that agent must derive more value from the chosen alternative."[76] What we observe in reality is customers often using many SECURE and Tervita facilities, and often using facilities of both companies interchangeably. For example, large customers have many wells and use multiple SECURE or Tervita facilities. See Figure 10 and Figure 11 below, which show that the [redacted] SECURE customers each use on average [redacted] TRDs, [redacted] LFs, and [redacted] WDs, and the [redacted] Tervita customers each use one average [redacted] TRDs, [redacted] LFs, and [redacted] WDs. [redacted]

[75] [redacted] *See*, Miller Report, ¶¶ 34-35. [redacted] *See also,* Engel Affidavit, ¶¶ 59-60.

[76] Miller Report, ¶ 136.

[77] Engel Affidavit, ¶ 57(b).

[78] Engel Affidavit, ¶ 57(b).

[redacted]

Sources:

Miller Transactions Data, replicated through 15_build_secure_transaction_data_distances.R and 16_build_tervita_transaction_data_distances.R.

[redacted]

Sources:

Miller Transactions Data, replicated through 15_build_secure_transaction_data_distances.R and 16_build_tervita_transaction_data_distances.R.

66. Many customers not only use multiple facilities of the same Party, but also use both Parties' facilities interchangeably.[79] As shown in Figure 12 below, out of the [redacted] customers of each of SECURE and Tervita shown above, [redacted] are common to the [redacted] of both Parties (i.e., SECURE and Tervita shared many of the same largest customers). For these [redacted] customers, on average, [redacted] of the facilities they used in 2019 were SECURE facilities (accounting for [redacted] of their total spend), and [redacted] were Tervita facilities (accounting for [redacted] of their total spend). These findings are contrary to Dr. Miller's assumption that waste service facilities are significantly differentiated from the customer perspective, and that a customer simply reveals its preference for a particular preferred facility.

[79] [redacted]

Sources:

Miller Transactions Data, replicated through 15_build_secure_transaction_data_distances.R and 16_build_tervita_transaction_data_distances.R.

III.A.3. Dr. Miller's model ignores buyer power and the threats of customer insourcing or sponsored entry

67. Dr. Miller's auction model with price discrimination also fails to account for the negotiating leverage of customers in this industry. So called "buyer power" provides additional constraints on pricing independent of the asserted relative value of alternative facilities to the customer well location.

68. SECURE's (and formerly Tervita's) customers are oil and gas producers, many of whom have substantial oilfield operations and their own waste disposal facilities. As shown in Figure 10 and Figure 11 above, the [redacted] customers of SECURE and Tervita in 2019 accounted for [redacted] of total revenue for SECURE and [redacted] for Tervita. Not only do the largest customers account for substantial portions of total revenue for SECURE and Tervita, but as mentioned above they also utilize multiple facilities and multiple facility types.

69. While I broadly agree with Dr. Miller's assessment that TRDs, LFs, and WDs are not widely substitutable for each other for a given waste service that a customer requires, ultimately it is the same oil and gas producers that require most if not all of these services. This affects pricing for large proportions of the Parties' revenues.

70. [redacted] Customers can and do use their water disposal volumes and threats to shift this volume in negotiating with waste service providers across a range of services and locations.[83]

71. In discussing the role of producer self-supply for water disposal and landfills, Dr. Miller focusses on the observation that most producer self-supply points are used for internal disposal and are not available to other producers, or that volumes available for use by other producers at these first-party facilities are relatively small. On this basis, he finds that producer-owned disposal facilities are unlikely to be viable alternatives to third-party owned facilities for all customers.[84]

72. What Dr. Miller fails to account for is that even if producer-owned facilities are not readily available to other producers, their existence or threat of existence impacts the demand for third party waste disposal services and the prices they can charge. That is, the ability of a large customer to self-supply and construct its own wells for water disposal is sufficient to discipline pricing – and not just to water disposal, but also to other services because customers can leverage the entirety of their purchases when negotiating with a supplier.[85]

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80 [redacted]

81 Miller Report, footnote 363.

82 See Miller Report backup, "Exhibit 9.xlsx" and my backup to Figure 21.

83 *See*, e.g., [redacted]

84 *See*, e.g., Miller Report, ¶¶ 64-69.

85 It is well understood that the threat of competition can constrain a firm's pricing. For a prominent empirical example from the airline industry, see Austan Goolsbee and Chad Syverson, "How Do Incumbents Respond to the Threat of Entry? Evidence from the Major Airlines," *Quarterly Journal of Economics* 123(4) 2008: 1611-1633, 1611. "We examine how incumbents respond to the *threat* of entry by competitors (as distinct from how they respond to *actual* entry)… We find that incumbents cut fares significantly when threatened by Southwest's entry." *See also*, Jean Tirole, *The Theory of Industrial Organization,* Cambridge: The MIT Press, 1988, pp. 308-309, discussing a model under which market contestability impacts incumbent firms' pricing, "[i]n the absence of actual competition, potential competition is very effective in disciplining the incumbent firms." *See also*, Affidavit of Chris Hogue, Commissioner of Competition v Secure Energy Services Inc., CT-2021-

73. There is ample documentary evidence that SECURE and Tervita are aware of the threat of customer insourcing, whether or not facilities become available to other producers. [redacted]

74. When insourcing does occur, it impacts financial performance.[89] [redacted]

002, March 24, 2022, ¶¶ 13-14, 16; Affidavit of Robert Broen, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, March 24, 2022, ¶¶ 25-26; Affidavit of Rodney Gray, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, March 25, 2022, ¶¶ 15-16.

86 [redacted]

87 [redacted]

88 [redacted]

89 *See*, for example, [redacted]

[redacted]

75. [redacted]

[redacted]

90 [redacted]

91 [redacted]

92 *See*, for example, [redacted]

93 [redacted]

94 [redacted]

[redacted]

76. Further, SECURE and Tervita have noted that there is an industry trend towards the insourcing of waste disposal.[97] [redacted] In the Affidavit of Darren Gee of Peyto

[redacted]

95 [redacted]

96 [redacted]

97 *See*, for example, [redacted]

98 [redacted]

99 [redacted]

Exploration and Development, he states that after periods of low commodity prices, "those who have survived have become increasingly efficient and cost conscious" and that "recent industry consolidation means that the producers that survived the downturn are bigger and more capable of in-sourcing."[100]

77. In addition to the threat of third party entry and customer insourcing, customers also encourage suppliers to enter the market by sponsoring new facilities and/or guaranteeing business.[101] For example, Tervita reached an agreement in 2019 "with a senior E&P to develop a water disposal network including multiple disposal wells and a water injection facility pipeline connected to the E&P's production facilities in the Alberta Montney."[102] Another example is the announcement of Topaz Energy in 2021 to enter into "a strategic alliance with a private midstream water company" in order to "each acquire a working interest in certain water infrastructure assets from an E&P producer."[103]

III.B. A standard natural experiment confirms the presence of pricing constraints that Dr. Miller's model does not capture

78. In 2018, Tervita acquired Newalta in a merger that involved substantially the same products and geographies as the Transaction, including "2-to-1" and "3-to-2" markets. As I describe in greater detail below, I conduct a natural experiment analysis to estimate the price effects of the Tervita/Newalta merger. I do so using a standard "difference-in-differences" ("DiD") approach, accounting for, among other things, the fact that SECURE's presence as a remaining competitor in Tervita/Newalta may have imposed a constraint on pricing that is no longer present today.

[redacted]

100 *See*, Affidavit of Darren Gee, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, March 25, 2022, ¶¶ 7, 13.

101 *See*, Affidavit of Darren Gee, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, March 25, 2022, ¶ 15; Affidavit of Robert Broen, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, March 24, 2022, ¶ 27.

102 [redacted]

103 [redacted]

79. I find that the Tervita/Newalta merger resulted in significantly lower price effects than what Dr. Miller predicts will occur from the SECURE/Tervita Transaction. In particular, as summarized below in Figure 13, 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. I discuss alternative specifications and robustness checks below and in Appendix D.

FIGURE 13: SUMMARY OF PRICE INCREASES FROM TERVITA/NEWALTA NATURAL EXPERIMENT

# of Competitors Prior to Newalta Acquisition		Difference-in-Differences Price Effect [A]	No. Observations [B]	R^2 [C]
Two Competitors	[1]	11.0%*	646	0.912
Three Competitors	[2]	9.8%	586	0.940
Four or More Competitors	[3]	0.9%	444	0.946

Sources: See material provided in my backup, "Newalta Analysis Backup."

Notes: *, **, *** indicates statistical significance at 10%, 5% at 1% levels, with standard errors corrected for clustering at the facility level.

1. Market structure before Newalta acquisition is calculated for each customer, UWI and product (substance-service). These are then aggregated across UWIs to the customer-facility-substance level, weighting by sales.

2. Analysis excludes natural experiments with prices changes that exceed the 99th percentile or are less than the 1st percentile.

3. Regressions include Facility & Product fixed effects.

80. These results call into question the reliability of the predicted price effects based on Dr. Miller's second-score auction model. This is not surprising, given that Dr. Miller's model does not account for the true pricing constraints that exist in the industry, as discussed above.

81. In the sections that follow, I explain why the standard natural experiment is reliable for predicting the effects of the SECURE/Tervita Transaction. The technical details of the natural experiment methodology can be found in Appendix D.

III.B.1. The utility of natural experiments

82. Broadly speaking, economists estimate the price effects of a merger through one of two approaches. The first, which I call the theoretical approach, is a prospective analysis that uses a theoretical model of competition together with available real-world data to attempt to predict how market participants' behaviour would change following the merger. Dr. Miller's merger

simulation is an example of this theoretical approach. To accurately predict the effect of the merger, the theoretical approach requires selecting an appropriate theoretical model such that it can accurately predict market participants' real-world behaviour after the merger.

83. The second approach is a retrospective approach that estimates the likely outcome of the merger at hand by examining observed real-world outcomes from analogous settings (e.g., a natural experiment assessing analogous prior mergers, or one involving entry and exit by competitors). This approach requires selecting a real-world setting for study that (1) is reasonably analogous to the merger at hand, and (2) is amenable to analysis that allows us to isolate the causal effect of the merger on the outcomes of interest. Studies of natural experiments are examples of such retrospective analysis.[104]

84. Natural experiments are real-world settings where some event or other features create a situation analogous to a controlled experiment, where some individuals are exposed to the event or "treatment" condition (often called the "treatment group"), while others are not (usually called the "control group"). An ideal natural experiment will "assign" individuals to the treatment and control groups such that there are no systematic differences between the groups. As such, by comparing the differences in outcomes between the treatment and control groups using appropriate statistical techniques, we can estimate the causal effect of the treatment condition on the outcome of interest.[105]

85. A Bureau guidance document that I authored explains how the Bureau has used natural experiments to predict merger effects in the retail industry. Specifically, it states that "[t]he Bureau also reviews natural experiments that may have occurred over time, such as mergers or prior entry/exit from this or similar markets. When data are available, the Bureau uses time-

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[104] For a meta analysis of merger retrospectives that have been conducted, see John Kwoka, *Mergers, Merger Control, and Remedies*, Cambridge: The MIT Press, 2015. A similar comparison of ex-post effects from a transaction to ex ante simulation predictions have been undertaken in other industries. *See*, for example, Craig Peters, "Evaluating the performance of merger simulation: Evidence from the US airline industry," *The Journal of Law and Economics* 49(2) 2006: 627-649.

[105] Canadian economist David Card was awarded the most recent Nobel Prize for Economics in part for his pioneering use of natural experiments. The Royal Swedish Academy of Sciences, "The Prize in Economic Sciences 2021," *Press Release*, October 11, 2021, https://www.nobelprize.org/prizes/economic-sciences/2021/press-release/. One of his most widely cited studies examined the effect of a minimum wage increase on employment by comparing fast-food stores in New Jersey (the treatment group which experienced the minimum wage increase) to fast-food stores in neighboring Pennsylvania (the control group which did not experience an increase). David Card and Alan B. Krueger, "Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania," *American Economic Review* 84(4) 1994: 772-793.

series regression analysis to estimate the impact these events may have had on prices, discounts or margins and then uses those estimates to predict the potential price effects from this merger."[106]

86. DiD is a common statistical technique used in analyzing natural experiments, and is often applied to estimate the price effects of mergers both in the academic literature and in regulatory or legal proceedings.[107] Indeed, the Commissioner and his experts have relied on natural experiments and difference-in-differences in prior matters. For example, Prof. Michael Baye, working for the Commissioner, used natural experiments and difference-in-differences to assess the effect of new entrants on prices in the hazardous waste disposal industry in Tervita's acquisition of Complete Environmental in 2011.[108] As with any retrospective analysis, evaluating whether it is useful for predicting the outcome of a similar event is a transparent exercise of examining the similarities and differences between the two settings, and assessing whether the methodology sufficiently isolated the treatment effect from factors or conditions not shared by the forward-looking setting.[109]

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[106] Renée M. Duplantis, "Economic Analysis of Retail Mergers at the Competition Bureau," *Canadian Competition Bureau*, September 15, 2014, pp. 6-7 (footnotes omitted).

[107] Within the academic literature, DiD analysis is a widely-used methodology for evaluating the price changes attributable to mergers or similar events. *See*, for example, Dennis Rickert, Jan Philip Schain, and Joel Stiebale, "Local Market Structure and Consumer Prices: Evidence from a Retail Merger," *Journal of Industrial Economics* 69(3) 2021: 692-729. *See also, e.g.,* Justine S Hastings, "Vertical Relationships and Competition in Retail Gasoline Markets: Empirical Evidence from Contract Changes in Southern California," *American Economic Review*, 94(1) 2004: 317–328. The straightforward statistical properties of DiD have made it a central tool for evaluating the performance of the theoretical approach in predicting the price effect of mergers. *See*, Matthew C. Weinberg, "More Evidence on the Performance of Merger Simulations," *American Economic Review* 101(3) 2011: 51-55; and Craig Peters, "Evaluating the Performance of Merger Simulations: Evidence from the U.S. Airline Industry," *Journal of Law and Economics* 49, 2006: 627–649. Proponents of DiD and similar methods emphasize the transparency and relative simplicity of these methods. *See*, Joshua D. Angrist and Jörn-Steffen Pischke, "The Credibility Revolution in Empirical Economics: How Better Research Design is Taking the Con out of Econometrics," *Journal of Economic Perspectives* 24(2) 2010: 3–30, generally, and pp. 20-22 for a specific discussion in the context of industrial organization and merger analysis. Prof. Angrist was a co-recipient of the 2021 Nobel Prize in Economics, along with David Card.

[108] RBBA00007_000000036-00001 at RBBA00007_000000036-00069-RBBA00007_000000036-00072, Expert Report of Michael R. Baye, Sept. 30, 2011, *Commissioner of Competition v. CCS Corporation,* Competition Tribunal CT-2011-002, Section VIII.D.2.

[109] As Angrist and Pischke put it, "Empirical evidence on any given causal effect is always local, derived from a particular time, place, and research design… Economic theory often suggests general principles, but extrapolation of causal effects to new settings is always speculative. Nevertheless, anyone who makes a living out of data analysis probably believes that heterogeneity is limited enough that the well-understood past can be informative about the future." Joshua D. Angrist and Jörn-Steffen Pischke, "The Credibility Revolution in Empirical Economics: How Better Research Design is Taking the Con out of Econometrics," *Journal of Economic Perspectives* 24(2) 2010: 3–30, p. 23. *See also*, Daniel Hosken, Luke M. Olson, and Loren K. Smith, "Do retail

87. The fundamental insight behind the DiD approach is that, in order to determine the price effect of an event (I will use a merger to illustrate here), we must account for how prices would have otherwise changed if the merger did not occur. We cannot simply compare the prices paid by the affected customers before the merger to the prices paid after the merger, because prices may have otherwise increased or decreased for a reason unrelated to the merger. For example, suppose we observe that the price of hamburgers at some locations of two fast-food chains increased after their merger. That price increase may be attributable to the merger, but it could also be the result of unrelated economic forces: for instance, there may have been an increase in the price of beef; or wages may have risen due to an overall shortage of workers. The DiD approach allows us to isolate the effect of the merger by comparing the change in prices paid by customers affected by the merger (the "treatment group") to the change in prices paid by customers who were not (the "control group"). To use a common approach to selecting a control group in merger analysis, we might use the prices at locations of the merging fast-food chains where they did not directly compete prior to the merger, but instead competed with a third, unrelated chain. By comparing the difference in prices (i.e., the before-and-after price changes) at the treatment locations to the difference in prices at the control locations (or, in other words, by calculating the difference in these differences, hence the name of the technique) we can isolate the price effect of the merger.

III.B.2. The 2018 Tervita/Newalta merger is a powerful natural experiment for assessing the effects here

88. In March 2018, Tervita and Newalta announced their intention to merge their operations into a single entity under the Tervita name to create the "largest energy-focused waste and environmental services company in Canada serving energy and industrial customers."[110] Both companies provided "energy-focused waste disposal services within the Western Canadian Sedimentary Basin" and the merger was reviewed by the Bureau under the *Competition Act*, with the focus of the Bureau's review being the "parties' oilfield waste disposal services within the Western Canadian Sedimentary Basin."[111]

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mergers affect competition? Evidence from grocery retailing," *Bureau of Economics Federal Trade Commission*, Working Paper No. 313, December 2012, https://www.ftc.gov/sites/default/files/attachments/guarding-consumers-pocketbooks/wp313.pdf.

110 Tervita, "Newalta and Tervita Agree to Merge to Create the Leading Energy-Focused Environmental Solutions Provider in Canada," March 1, 2018, https://tervita.com/news/article/newalta-and-tervita-agree-to-merge-to-create-the-leading-energy-/.

111 Competition Bureau Canada, "Competition Bureau continues Tervita and Newalta merger review," July 20, 2018, *News Release*, https://www.canada.ca/en/competition-bureau/news/2018/07/competition-bureau-continues-tervita-and-newalta-merger-review.html.

89. The Tervita/Newalta merger involved consolidation of the same waste service assets and operations as are present in the SECURE/Tervita Transaction, including TRDs, WDs, and LFs. The Tervita/Newalta merger also involved combinations within similar competitive landscapes and market structures – e.g., local areas where the merger would reduce customer supply alternatives from "2-to-1" or from "3-to-2" as well as other market structures.

90. While the analysis of the effects of prior mergers in the same geographic areas and involving the same products (like the Tervita/Newalta merger) can be quite helpful in serving as a proxy for the potential effects of a proposed transaction (like the SECURE/Tervita transaction), as I have noted, care must be taken with the relevant differences between the two mergers. 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. As explained below, I account for this in my analysis by separately analyzing areas where SECURE was present in the Tervita/Newalta merger and areas where it was not.

91. Another distinction is that Tervita was the acquirer in the Newalta merger and SECURE is the acquirer in the Transaction at hand, and as discussed in Section III.A.2 above, SECURE and Tervita had philosophical differences in their operations, including in setting prices. [redacted],[112] it is reasonable to expect that the price effects estimated from Tervita's acquisition of Newalta would overstate the likely price effects that could be expected from the current Transaction.

92. Overall, I believe that the Tervita/Newalta merger is a highly analogous and therefore insightful retrospective for the purpose of evaluating the effects of the Transaction, and the empirical methodology I employ inherently accounts for the key pricing factors that Dr. Miller's theoretical model fails to do.

III.B.3. Approach to estimating the effect of the Tervita/Newalta natural experiment

93. When undertaking the DiD analysis for the Tervita/Newalta merger, I apply the same customer-centric approach to geographic market definition that Dr. Miller applies to define markets.[113] I

[112] See discussion of Tervita and SECURE's pricing philosophies in Section III.A.2 above.

[113] Miller Report, Section 4.2.

also assign products (substance-service combinations) into product markets using Dr. Miller's classifications.[114]

94. I provide the technical details of the analysis in Appendix D, but at a high level, there are four main steps in the analysis I undertake to examine the prior Tervita/Newalta transaction:

    a. Assess the market structure around each customer-well location for each product purchased before and after the merger.[115] (This step is identical to Dr. Miller's approach to customer-centric geographic markets).

    b. Aggregate customer well locations up to the level of an individual customer at a given facility for each product purchased, and calculate the weighted average price and market structure (weighted by revenue) for each customer-facility-substance combination. This aggregation allows me to assess prices for each type of waste delivered by a customer to each facility for disposal. For example, if a customer well location disposes of its waste at two different facilities, that customer would have two prices (one for each facility) factoring into the analysis.

    c. For each type of waste delivered by a customer to a facility, those customers that experienced a change in market structure due to the Tervita/Newalta merger form the "treatment" observations in the difference-in-differences framework. The "control" observations are the customers that saw no change in market structure for each product purchased.

    d. Calculate the change in prices for each customer-facility-substance combination between 2017/2018 and 2019/2020. 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.[116] So that the comparison of

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[114] Miller Report, Section 4.1 and Appendix Section 7.7. *See also*, Miller Report backup, "service_classification_secure_tervita.xlsx," which I have extended to also cover products sold by Tervita during the period 2017/2018 in the file "Tervita Product xWalk.xlsx" available in my backup materials.

[115] As discussed in Appendix D, the transaction-level data record the customer well location, the facility used and the product purchased (i.e., product and substance combination). My analysis is conducted at the customer, facility and substance combination.

[116] Tervita announced the Bureau's investigation of the transaction had concluded on the one-year anniversary of the closing of the transaction. *See*, Tervita, "Tervita Corporation Announces End of Competition Bureau Review Period for the Newalta Transaction," July 22, 2019, https://tervita.com/news/article/tervita-corporation-announces-end-of-competition-bureau-review-p/.

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.

before and after price changes is undertaken over a consistent set of months and thereby not affected by the possibility of seasonality, the pre-period includes the time period August 2017 to March 2018.

e. Compare the before-and-after change in prices among treatment observations to the change in prices among control observations to determine the overall effect of the merger. I define separate treatment and control groups for each pre-merger market structure. For example, I compare the "3-to-2" treatment group to observations that remained in a 3-competitor market structure from 2017/2018 to 2019/2020. I also account for markets where SECURE was a remaining competitor after the Tervita/Newalta transaction.

95. As discussed below and in Appendix D, I first conduct the analysis by looking at simple averages to illustrate the DiD methodology and then extend it to a regression analysis, which allows me to control for other important factors, like cost changes. Finally, I conducted numerous robustness checks on the regression specification, which are discussed in Appendix D and detailed in my backup.

III.B.4. The natural experiment results confirm that Dr. Miller's auction model is not reflective of likely competitive effects

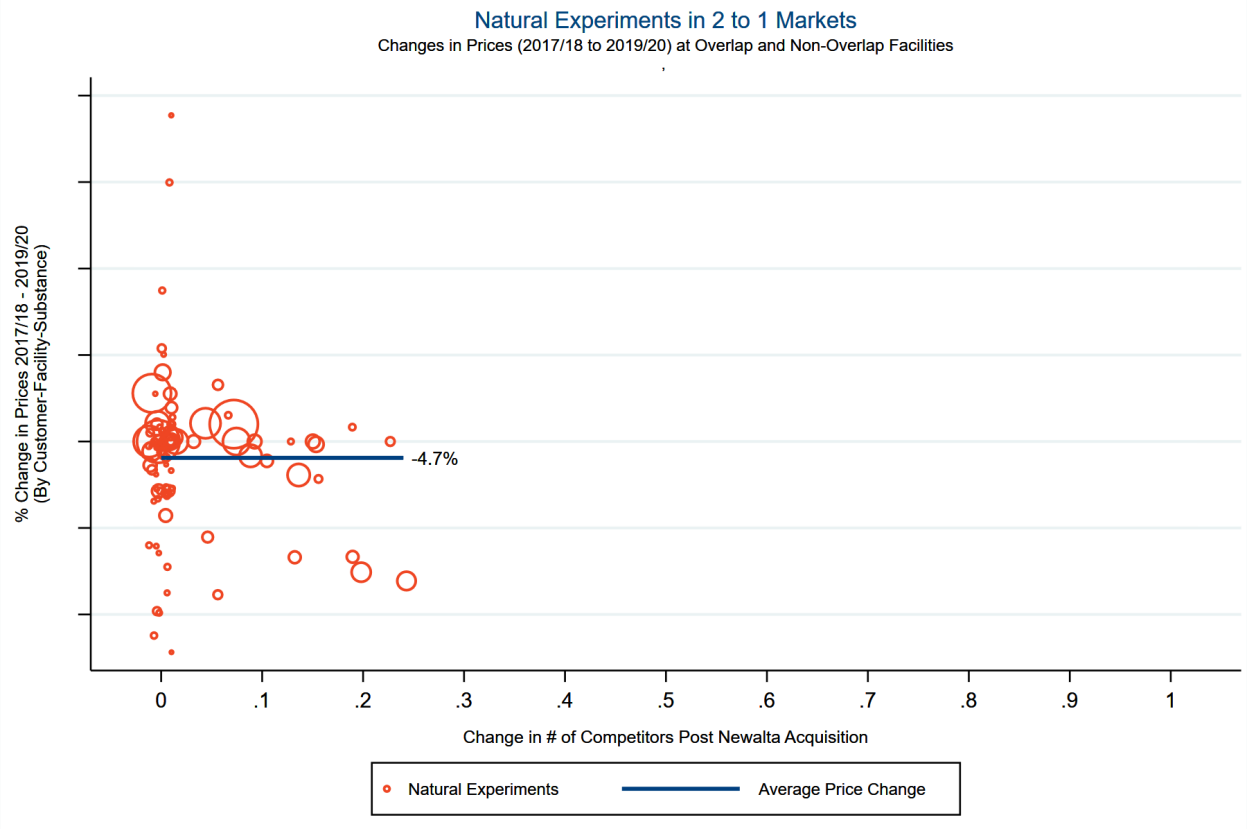
96. In Figure 14, Figure 15, and Figure 16 below, I provide visual illustrations of the natural experiment analysis using simple averages, limiting the analysis to customers who pre-merger had two suppliers to choose from, for ease of illustration.[117] Each circle in the plot is the price change calculated between 2017/2018 and 2019/2020 for a given customer-facility-substance combination that had two competitors in their market in 2017/2018, and the size of the circle represents the relative revenue for that customer.

97. In Figure 14, for each customer-facility-substance combination, I show those observations that did not experience a change in their available suppliers as a result of the Tervita/Newalta merger. These are instances where the pre-merger market structure was two competitors in 2017/2018, and remained that way in 2019/2020 (or the customer experienced almost no

[117] The illustrative figures below incorporate all natural experiments, but the analysis is conducted several different ways as outlined in Appendix D.

change on average).[118] Said differently, there was no Tervita/Newalta overlap for these "2-to-2" customers. The average before-and-after price change for these customers is -4.7%.

FIGURE 14: PLOT OF AVERAGE PRICE CHANGES WITH NO CHANGE IN COMPETITION



Sources: See material provided in my backup, "Newalta Analysis Backup."

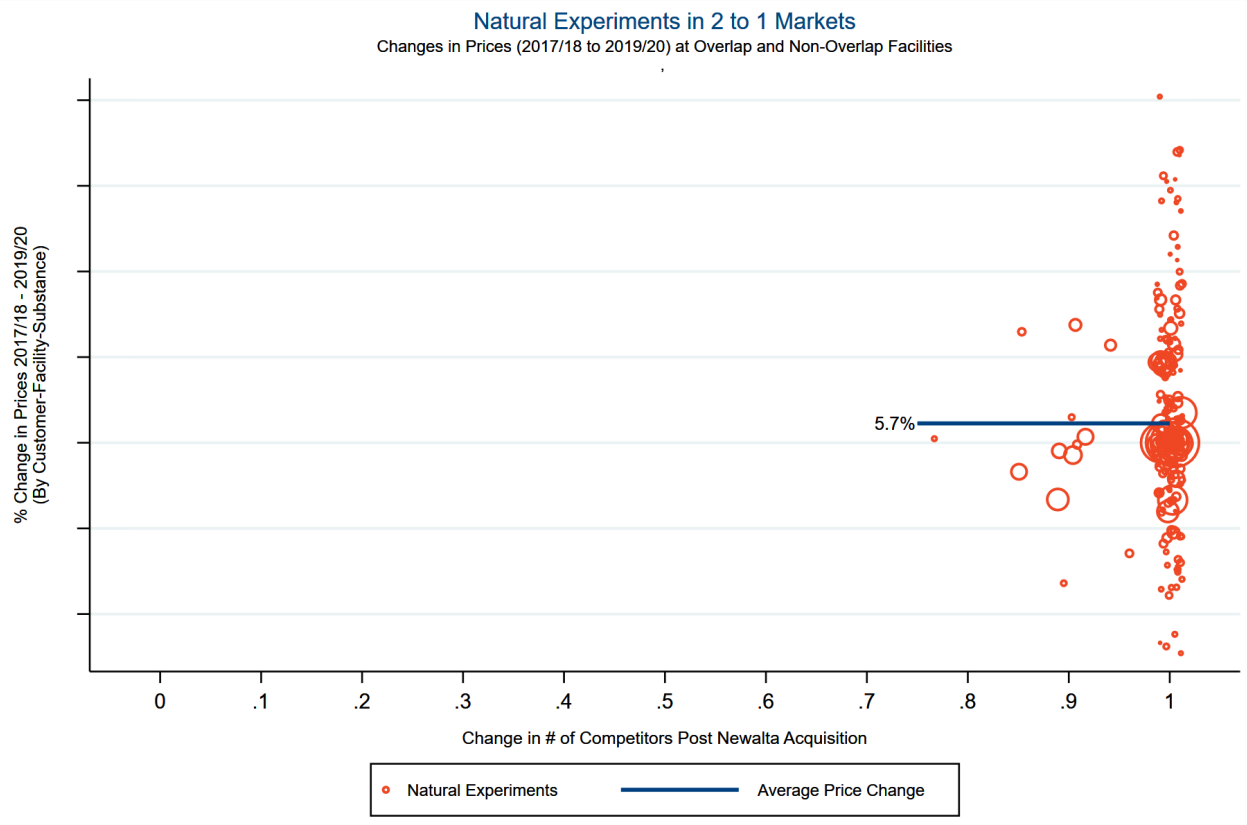
Notes: I am averaging across a customer's well locations for a given facility, which can result in non-integer market structures. For example, if a customer has two well locations spread out around a facility, with the market structure around one well being three competitors and the market structure around the second well being 2 competitors, then the average market structure for the customer at that facility is 2.5.

98. In Figure 15, I show those customer observations that did experience a change in market structure as a result of the merger. These are instances where the pre-merger market structure was two competitors in 2017/2018 and the post-merger market structure is only one competitor in 2019/2020 (or the customer experienced a change on average). Said differently,

[118] An almost no change is one where, on average, the difference in the market structures for the customer between 2017 and 2019 is less than 0.25. A small change is one where, on average, the difference in the market structures for the customer between 2017 and 2019 is between 0.25 and 0.75. A large change is one where, on average, the difference in the market structures for the customer between 2017 and 2019 is greater than 0.75. The majority of customers fall either in the no change category or the large change category.

these were customers who only had Tervita and Newalta as alternatives, i.e., "2-to-1s." The average before-and-after price change for these customers is 5.7%.

FIGURE 15: PLOT OF AVERAGE PRICE CHANGES WITH A CHANGE IN COMPETITION

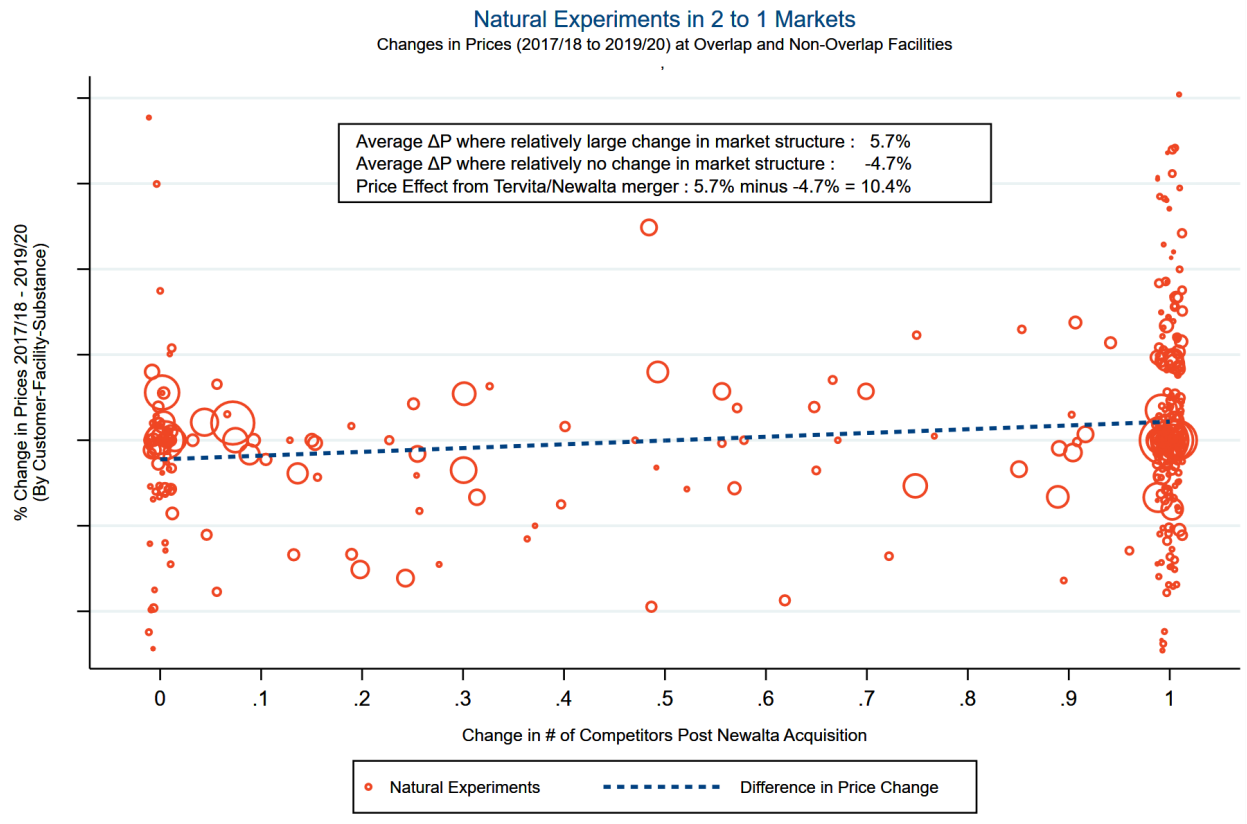


Sources: See material provided in my backup, "Newalta Analysis Backup."

Notes: I am averaging across a customer's well locations for a given facility, which can result in non-integer market structures. For example, if a customer has two well locations spread out around a facility, with the market structure around one well being three competitors and the market structure around the second well being 2 competitors, then the average market structure for the customer at that facility is 2.5.

99. In Figure 16, I combine the prior two plots. The DiD analysis is conducted by comparing the price changes between these two groups, and subtracting the average price increase for those customers who did not experience a change in market structure (from the first plot the average was -4.7%) from the average price increase for those customers who did experience a change in market structure (from the second plot the average was 5.7%). Accordingly, the average effect of the Transaction is 10.4% (5.7% - (-4.7%) = 10.4%).

FIGURE 16: PLOT OF DIFFERENCE IN AVERAGE PRICE CHANGES



Sources: See material provided in my backup, "Newalta Analysis Backup."

Notes: I am averaging across a customer's well locations for a given facility, which can result in non-integer market structures. For example, if a customer has two well locations spread out around a facility, with the market structure around one well being three competitors and the market structure around the second well being 2 competitors, then the average market structure for the customer at that facility is 2.5.

100. The simple average analysis discussed above can be extended to a regression framework, which allows me to determine the statistical significance around each point estimate. In addition, the above comparison was conducted over all customers, including those that would have had SECURE as a competitive alternative following Tervita and Newalta's merger. In Figure 17 below, I provide the price effects that the natural experiment shows occurred following the Tervita/Newalta merger using the regression methodology. These include the baseline results shown above in Figure 13, as well as an alternative specification.[119] The baseline model is specified at the customer-facility- substance level, with the analysis also being undertaken at the customer-facility-substance service level as an alternative. Moreover, to account for the

[119] See Appendix D for details.

potential that the results would be affected by having SECURE as a remaining competitor to the merged Tervita/Newalta entity, I restrict attention to natural experiments where SECURE was not an alternative for most customers.[120]

101. As shown, prices increased on average as a result of the Tervita/Newalta merger by up to 11.0% for customers who experience a change in the number of suppliers from "2-to-1," 9.8% for customers who experience a change in the number of suppliers from "3-to-2," and 0.9% for customers who experience a change in the number of suppliers from "4-to-3 or more" competitors.[121] For the alternative specification, prices increased on average as a result of the Tervita/Newalta transaction by 6.4% for customers who experience a change in the number of suppliers from "2-to-1", up to 5.7% for customers who experience a change in the number of suppliers from "3-to-2" and up to 2.1% for customers who experience a change in the number of suppliers from "4-to-3 or more" competitors. The results in the "3-to-2" categories and the "4-to-3 or more" categories are not statistically significant. This means that the model cannot determine with statistical precision whether or not the estimates are actually different from zero.[122]

[120] Specifically, I consider cases where SECURE was a competitive option for at most 25% of a customer's waste purchases in 2019/2020.

[121] See Appendix D for more details.

[122] Specifically, within a 95% confidence interval, I am unable to reject the null hypothesis that the coefficient on the merger effect is not statistically different from zero. Even though the estimates cannot be differentiated from zero, I continue to use the point estimates in my analyses to be conservative.

FIGURE 17: SUMMARY OF PRICE INCREASES FROM TERVITA/NEWALTA NATURAL EXPERIMENT

# of Competitors Prior to Newalta Acquisition		Difference-in-Differences Price Effect [A]	No. Observations [B]	R^2 [C]
Across Customers, Facilities and Substance-Services				
Two Competitors	[1]	6.4%**	1,526	0.966
Three Competitors	[2]	2.2% to 5.7%	1,216	0.966
Four or More Competitors	[3]	1.3% to 2.1%	798	0.974
Across Customers, Facilities and Substances				
Two Competitors	[4]	3.1% to 11.0%*	646	0.912
Three Competitors	[5]	9.8%	586	0.940
Four or More Competitors	[6]	0.9%	444	0.946

Sources: See material provided in my backup, "Newalta Analysis Backup."
Notes: *, **, *** indicates statistical significance at 10%, 5% at 1% levels, with standard errors corrected for clustering at the facility level.

1. Market structure before Newalta acquisition is calculated for each customer, UWI and product (substance-service). These are then aggregated across UWIs to the customer-facility-substance level, weighting by sales.

2. Analysis excludes natural experiments with prices changes that exceed the 99th percentile or are less than the 1st percentile.

3. Regressions include Facility & Product fixed effects.

102. As described in more detail in Appendix D, these estimates are robust to various other specifications for undertaking the analysis, including different aggregation methodologies and the inclusion of other explanatory variables, like costs. In all instances, the results are holistically consistent and the estimated effect of the Tervita/Newalta merger is less than or equal to the estimates noted in the table above.

103. These quantitative results are consistent with real-world qualitative evidence, as some customers contacted by the Commissioner during the merger review process specifically indicated that they did not experience price effects resulting from the Tervita/Newalta merger. [redacted]

123 [redacted]

[redacted]

104. Dr. Miller's modelling predicts price effects that do not account for important market dynamics that influence prices, and for this reason (among others) his predicted price increases are unrealistic. Predicting price effects based on appropriate natural experiments, as I have done, intrinsically accounts for such factors by analyzing actual pricing outcomes.

III.C. Dr. Miller's model would have shown effects in the Tervita/Newalta merger that did not occur

105. Dr. Miller uses a merger simulation model to predict the price effects from the Transaction. While in concept, I do not criticize the use of a simulation model to predict potential price increases, any predicted price increases must be considered carefully. Not only does the model have to fit the industry, but every simulation model will predict price increases as long as margins are positive and there is some diversion between the merging firms.

106. To test the reliability of Dr. Miller's simulation model, I take his model, along with his market definition approach, and apply it analogously to the Tervita/Newalta merger to predict the price

[redacted]

effects from that merger.[128] Essentially, I am stepping back in time and using the 2017 data that would have been available if Dr. Miller had been asked to analyze the Tervita/Newalta merger, and I apply his model to demonstrate the price effects that his second-score auction model would have predicted for that merger. Then I compare those predicted price effects to the actual price effects that I calculated from the Tervita/Newalta natural experiment.

107. As shown in Figure 18 below, I find that Dr. Miller's model predicts the Tervita/Newalta merger should have resulted in price effects of on average up to 45.5% for "2-to-1" markets, 14.8% for "3-to-2" markets, and of 7.5% for "4–to-3 or more" markets.

FIGURE 18: PREDICTED PRICE INCREASE FROM DR. MILLER'S AUCTION MODEL APPLIED TO TERVITA/NEWALTA MERGER

Change in Market Structure From Merger		TRD [A]	Landfill [B]	Water Disposal [C]	**Weighted Avg.** [D]
2-to-1	[1]	43.7%	-	50.8%	**45.5%**
3-to-2	[2]	15.3%	53.0%	2.9%	**14.8%**
4-to-3 (or higher)	[3]	8.7%	8.8%	6.2%	**7.5%**

Sources: See material provided in my backup, "Newalta Analysis Backup."

108. The price predictions using Dr. Miller's model applied to the Tervita/Newalta merger are very similar in magnitude to the weighted average price effects that Dr. Miller predicts for the current Transaction. However, as discussed in Section IV.B.4 above, the Tervita/Newalta transaction did not actually generate average price increases that are anywhere as high as those predicted by Dr. Miller's simulation model, including in locations where SECURE was not a competitive constraint.

109. Figure 19 below compares the predicted price effects from Tervita/Newalta, the estimated price effects from the natural experiment from the Tervita/Newalta transaction, and the predicted price effects from the current Transaction. From an economic perspective, this is

[128] As discussed in Appendix E, I have used all of Dr. Miller's backup code for his model and have simply applied it to the 2017 data that would have been available at the time of the Bureau's review of the Tervita/Newalta transaction. Any differences, most notable of which would have been adding additional facilities that were open in 2017 but have subsequently closed, are described in Appendix E.

strong evidence that Dr. Miller's model cannot accurately predict the likely effects of the Transaction, and in fact substantially overstates those likely price effects.[129]

FIGURE 19: COMPARISON OF PRICE EFFECTS FROM DR. MILLER'S MERGER SIMULATION MODEL TO TERVITA/NEWALTA NATURAL EXPERIMENTS ANALYSIS

		Dr. Miller Analysis	Brattle Analysis	
		Dr. Miller Simulation for Secure/Tervita	**Dr. Miller Simulation Applied to Tervita/Newalta**	**Natural Experiment of Tervita/Newalta**
Change in Market Structure		Average Price Effect [A]	Average Price Effect [B]	Average Price Effect [C]
2-to-1	[1]	49.9%	45.5%	11.0%
3-to-2	[2]	23.2%	14.8%	9.8%
4-to-3 (or more)	[3]	12.3%	7.5%	0.9%

Sources: Figure 17, Figure 18, and Miller Report, Exhibit 21.

IV. Dr. Miller's facility closure effect analyses are methodologically flawed and incorrectly applied

110. Dr. Miller estimates facility closure effects from the Transaction using different methods. In this section, I explain why Dr. Miller's facility closure effect calculations are methodologically flawed and incorrectly applied. This section proceeds as follows:

a. First, I provide an overview of Dr. Miller's facility closure effect analyses.

b. Second, I explain that Dr. Miller's finding that there is a facility closure effect from closing profitable facilities ignores SECURE's profit-maximizing plan to shift waste services to other nearby facilities. In particular, I show that SECURE would only choose to close facilities if its own profits (and thereby total surplus) were going to increase after the closure, not decrease. This alone should be determinative that facility closures will not result in an effect

[129] Given that Tervita's pricing strategy (which is based more on distance to nearby facilities) better fits Dr. Miller's model than SECURE's pricing strategy, his model is more likely to apply to the Tervita/Newalta merger than the present Transaction. The fact that it fails to predict the actual price effects is thus further indication that his model is not appropriate.

as Dr. Miller suggests. However, I also show that real world evidence confirms that total surplus will not decrease from facility closures.

c. Third, even if I accept for argument's sake that SECURE was irrationally closing facilities, I explain why Dr. Miller's facility closure effect is substantially overestimated. In particular, Dr. Miller's facility-level variable margins at closing facilities are not an accurate representation of customer value of these facilities.

IV.A. Overview of Dr. Miller's facility closure effect analyses

111. Dr. Miller's facility closure effect stems from a single source: facility closures. If SECURE were not closing any facilities then Dr. Miller's facility closure effect of $78 million would not exist. Dr. Miller performs two related analyses, which I briefly explain below.[130]

a. "Based on profits of closed facilities." The premise of this calculation is that, under his second-score auction model's assumption that firms price discriminate and extract all the surplus from negotiating prices for each customer location, the facility-level variable profits lost when a facility closes represent a welfare loss.[131] In his view, the variable profits of closed facilities reflect the "value [oil and gas producers] derived from delivering wastes to that facility over other alternatives."[132] The factors that he refers to that account for this customer value of using one facility over another (reflected in facility variable profits) include transportation costs, wait times, capacity, and relationships.[133] Dr. Miller's separate calculation to estimate the effect of any increased transportation costs incurred by customers of the closed facilities is subsumed in his overall lost facility variable profits calculation.

b. "Based on market-share approach." This approach is similar to the first approach in that it quantifies a facility closure effect based on lost profits from facility closures, but also utilizes

[130] Miller Report, ¶ 133.

[131] Miller Report, ¶ 141.

[132] Miller Report, ¶ 148. It is important to note that the economics literature that Dr. Miller cites as support for his model reflect the introduction of a completely new good (e.g., the minivan, online newspapers), rather than the closure of a facility with the shifting of volumes from one facility to another facility in the same product market. Miller Report, ¶ 154 and footnote 258.

[133] Miller Report, ¶¶ 148, 153.

facility market shares in his relevant markets to assign value to closing facilities.[134] Dr. Miller notes that this approach aims to capture only customers in his relevant markets rather than all profits of the closed facilities.[135]

112. These methods are 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.

IV.B. Dr. Miller's finding that there is a facility closure effect ignores SECURE's profit-maximizing plan to shift waste services to other nearby facilities

IV.B.1. SECURE would only choose to close facilities if it would increase total surplus by doing so

113. In this section, I will explain why, under Dr. Miller's second-score auction model framework, SECURE would only choose to close profitable facilities if total surplus was going to *increase* following the closure of the facilities, not decrease as Dr. Miller assumes. This, alone, means that facility closures will not result in an effect as Dr. Miller suggests.

114. As I explained above in Section III.A.1, Dr. Miller's second-score auction model assumes that prices for waste services are set in a bargaining framework (or negotiation) between a customer location and a waste services provider location. In this negotiation, the waste services provider price discriminates, meaning it charges different prices to different customers at different locations. The reason each customer gets a customized price at each facility in the model is because the model assumes that customers value waste services differently at different facilities (e.g., due to being closer to one facility than another) and therefore have different willingness to pay at different facilities (which waste services providers observe). The waste services providers consider these differences when negotiating prices in an attempt to maximize their profits.

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[134] Miller Report, ¶ 154.

[135] Miller Report, ¶ 156.

115. With this price discrimination, the waste services providers maximize the economic "surplus" they extract from the negotiations with customers. As Dr. Miller states, "firms are able to extract the surplus from negotiating waste service prices with individual customers, and the closed facility profits quantify that surplus."[136] In Dr. Miller's framework, where producers extract maximum surplus from negotiations, facility variable profits also reflect incremental surplus the facility generates over customers' next best options.[137] This is the surplus that Dr. Miller claims will be lost through facility closures.

116. Now, staying within this framework, consider a waste services provider's decision to close a profitable facility or to keep it open. Logically, a profit-maximizing waste services provider would only elect to close a profitable facility (and lose its profits at that facility) if it could make up for these lost profits elsewhere and be at least as well off as it would have been had it kept the facility open. Conversely, if the waste services provider could not make up the profits elsewhere, it would keep the facility open.

117. Because facility profits also reflect the incremental surplus of the facility in Dr. Miller's framework, as I explained above, then I can replace "profits" with "surplus" in the prior sentence, and the same logic applies: If the waste services provider could not make up the surplus elsewhere, it would keep the facility open.

118. Dr. Miller claims that the profits of facilities to be closed represent the value lost to consumers from having this facility choice. However, this fails to recognize SECURE's profit-maximizing incentive to only close facilities if the lost profits (and lost surplus) at closed facilities will be offset by higher profits (and higher surplus) at other remaining facilities.[138] I understand that this is consistent with SECURE's merger integration plan, which has volumes from closed

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[136] Miller Report, ¶ 153.

[137] *See*, Miller Report, ¶ 214. In economic terms, when consumers and producers transact, consumer surplus is the benefits to customers from paying below their willingness to pay, and producer surplus is the benefits to producers from selling at a higher price than they would be willing to sell (i.e., above their costs). Consumer surplus and producer surplus together account for total surplus (or total welfare).

[138] The second-score auction model is an example of an efficient market mechanism. In such a mechanism, a seller's incremental profit from a facility is equal to that facility's marginal contribution to total surplus. Thus, closing a facility is profitable if and only if closing the facility increases total surplus. That is, a decision to invest in or close a facility will only be profit maximizing if it increases total surplus. *See*, Keith Waehrer, "Modeling the effects of mergers in procurement: Comment," September 9, 2021, https://waehrer.net/Comment_on_Miller__2014.pdf.

facilities shifting to absorbing facilities.[139] This is also consistent with Dr. Miller's second-score auction model, which predicts no change in output.[140]

119. Hypothetically, I will accept for a moment Dr. Miller's theory that customers of closed facilities value their new facility choice less, which the available evidence does not support aside from the possibility of transportation costs. In that case, SECURE will make up for those lost profits (and lost surplus) at closed facilities by offering improved service quality to customers at remaining facilities (which could increase customers' willingness to pay at alternative facilities) and/or by making the remaining facilities more efficient (i.e., lowering SECURE's variable costs).

120. Under the same principle of "revealed preference" that Dr. Miller relies on to explain how a customer's facility choice shows its preference for that facility over others,[141] the fact that SECURE is choosing to close these facilities is the strongest refutation of Dr. Miller's conjecture that total surplus will decrease from the merger. Instead, it reveals that total surplus will increase from the merger because, as noted above, SECURE will only close a facility if the lost profits (and thereby lost surplus) at that facility will be offset by higher profits (and thereby higher total surplus) at other remaining facilities.

121. In a comment responding to Dr. Miller's auction model paper, Dr. Keith Waehrer identifies this flaw in Dr. Miller's framework. In particular, Dr. Waehrer explains:[142]

> [T]he situation where the merger does make it profitable to eliminate a product is unlikely to occur at least as modeled in Miller (2014, 2017). This is not to say that we would never observe a merged firm eliminating a pre-merger product, only that if such a move was planned, additional factors are likely at play. One example of such a factor is a merger efficiency in the production capability for the retrained products post-merger leading to smaller anticompetitive effects than arise from the model proposed in Miller (2014, 2017) even with the discontinuation of a product. However, **the approach taken in Miller (2014, 2017) assumes an anticompetitive incentive**

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139 Harington Report, Appendix F.

140 I elaborate on this in Section V.A below.

141 Miller Report, ¶ 136.

142 Keith Waehrer, "Modeling the effects of mergers in procurement: Comment," September 9, 2021, p. 3, https://waehrer.net/Comment_on_Miller__2014.pdf.

> **to discontinue a product line that is generally alone not a profitable response to a merger**. [Emphasis added]

122. Dr. Waehrer then considers why a merged firm might discontinue a product, and notes, among others, the following:[143]

> When it discontinues one of the products, the merger firm plans on shifting some or all of the production capacity from the discontinued product to the retained product and thus increasing the contribution to total surplus from the retained product.

123. What Dr. Waehrer observes as profit-maximizing post-merger behaviour is precisely what we have in this case.

124. Relatedly, Dr. Miller is internally inconsistent in characterizing the extent of differentiation between the Parties' products. Dr. Miller is treating individual facilities as distinct "products" when he claims closure of facilities generates a welfare loss – i.e., a facility closure is akin to the discontinuation of a unique "product" that customers value relative to other options. While I agree facilities of the same type are differentiated to some extent (i.e., they are not commodities), they also are close substitutes.[144] Indeed, this closeness of competition between the Parties is the fundamental premise of the Commissioner's case and Dr. Miller's opinions with respect to the competitive effects he predicts from the Transaction.[145]

125. Despite concluding that the Parties services are close substitutes, Dr. Miller relies on a substantial amount of differentiation between the Parties' facilities (or even between two facilities of the same party) to arrive at his facility closure effect estimate. However, if there was such high differentiation between the parties facilities, it likely would not be in SECURE's interests to close facilities in the first place. Indeed, Dr. Miller himself notes in his second-score auction model paper that, in cases where "(i) the merging suppliers' products offer high and similar magnitudes of surplus and (ii) non-merging suppliers' products offer less total surplus,"

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143 Keith Waehrer, "Modeling the effects of mergers in procurement: Comment," September 9, 2021, p. 5, https://waehrer.net/Comment_on_Miller__2014.pdf.

144 As discussed above in Section III.A.2, customers use facilities interchangeably.

145 *See*, e.g., Miller Report, Section 5.2. Dr. Miller estimates high level of diversion between the Parties.

the discontinuation of a product (i.e., the closure of a facility in this case) will "not substantially reduce surplus."[146] Here, Dr. Miller is correct.

IV.B.2. A numerical example makes clear the flaw in Dr. Miller's logic that SECURE's profit-maximizing decision to close facilities could result in lower total surplus

126. I will now demonstrate the flaw in Dr. Miller's economic logic that total surplus will decrease with facility closures through a simple numerical example, based on the same example Dr. Miller uses to illustrate his model starting in paragraph 142 of his report:[147]

a. Consider a market with two waste service facilities, Facility A and Facility B. The fixed cost of operating each facility is $100 and the variable cost of serving each customer is $10. There are 20 customers, 10 of which (Type I) prefer Facility A and 10 of which (Type II) prefer Facility B. Type I customers have a willingness to pay of $40 at Facility A and a willingness to pay of $20 at Facility B, while Type II customers have a willingness to pay of $20 at Facility A and a willingness to pay of $40 at Facility B.

b. Pre-merger, we have the scenario that Dr. Miller describes in paragraph 144 of his report. Facility A and Facility B each charge $30 to lure the 10 customers that value their respective facility most highly. If either facility charged more, the other facility could serve the customer above its variable cost and steal the customer. Pre-merger, each facility earns economic profit equal to its price less its variable cost multiplied by the customers served from which its fixed costs are deducted. This provides economic profit (or producer surplus) of $100 per facility (($30-$10)*10 - $100 = $100), for a total of $200 in economic profit (or producer surplus) across the two facilities. Consumer surplus is also $200, because all 20 customers pay $10 less than their willingness to pay of $40. Summing the economic profit (or producer surplus) of $200 with the consumer surplus of $200 generates total surplus of $400.

c. Post-merger, both facilities continue to operate, but they can profit-maximize together because they are operated by a common owner. Adhering to Dr. Miller's example and assuming there are no other competitive alternatives, each plant now can charge $40

[146] Dr. Miller's auction model paper, p. 205.

[147] Dr. Miller's illustrates his price discrimination model with a static willingness to pay approach that is based on a one-shot game. In his numerical example, each customer type has a set willingness to pay for a given product. However, the waste disposal industry is not a simple static one-shot game as he has illustrated and as I elaborate on further in Section IV.C.3 below.

without risk of losing customers. Each facility earns economic profits equal to the post-merger price of $40 less the variable cost of $10 from which fixed costs are deducted, which means each facility has profits of $200 (($40-$10)*10 - $100 = $200), for a total of $400 in economic profit across the two facilities. There is no consumer surplus because all 20 customers pay their willingness to pay. Total surplus is $400.

d. Now, suppose the merged firm closes a facility (say, Facility B). Facility A is the only remaining option, and based on Dr. Miller's hypothetical example, Facility A charges each customer its willingness to pay. Type I customers have a willingness to pay at Facility A equal to $40, and Type II customers have a willingness to pay Facility B equal to $20, as noted above. When Facility A price discriminates, it charges each customer type its full willingness to pay. Thus, Facility A's economic profits equal the price charged to each customer type less its variable costs from which is deducted the fixed costs of operating Facility A. This generates for Facility A economic profits of $300 (($40-$10)*10 + ($20-$10)*10 - $100 = $300). There is no consumer surplus because all 20 customers pay their willingness to pay. Total surplus is $300, which is equal to the economic profit earned by Facility A.

127. This closure would be irrational. The merged firm can extract all of the surplus in both post-merger scenarios, but Facility A earns lower economic profits and total surplus is lower after closing Facility B.

128. The logical question, then, is when would it makes sense for the merged firm to close a facility? The answer is that to justify a facility closure, total surplus with the closure would have to be at least as high as total surplus with both plants in operation. This would occur here, for example, if surviving facilities were to become more efficient (reductions in variable costs from an economic perspective) and/or offer improved service quality to customers (which could increase their willingness to pay).[148]

IV.B.3. Real world evidence confirms that total surplus will not decrease from facility closures because it will increase at remaining facilities

129. The logical flaw in Dr. Miller's methodology that I just described should be determinative that facility closures will not result in surplus loss as Dr. Miller suggests. SECURE is a profit-

[148] In this example, total surplus would be unchanged ($400) if the variable cost of service to a customer were reduced from $10 to $5.

maximizing firm, and I have no reason to question that it is making rational business decisions to close facilities. As I explained in detail above, this alone is sufficient to conclude that total surplus will not decrease from facility closures.

130. In this section, I explain that real world evidence of SECURE's integration plans, including shifting of volumes and quality improvements at remaining facilities, supports that total surplus will increase at remaining facilities.

IV.B.3.a. SECURE's integration plan involves shifting volumes from closing facilities to remaining facilities, and customers will pay the same or similar prices as they paid before

131. SECURE's merger integration plan has volumes from closed facilities shifting to remaining facilities.[149] I understand that SECURE anticipates that its customers will generally pay the same or similar prices for substantially the same services at remaining facilities.[150] Indeed, many customers already use multiple SECURE facilities.[151] This means that most if not all of SECURE's profits will be recaptured through this mechanism alone. These are facilities that Dr. Miller includes in the same relevant product and geographic markets, meaning he considers them to be close substitutes.[152]

IV.B.3.b. Any loss in customer value from customers losing their theoretically preferred facility will be offset by improved quality and lower costs at remaining facilities

132. To the extent that SECURE cannot charge certain customer locations that use the closed facilities the same prices when they deliver waste to different facilities (i.e., accepting for a moment Dr. Miller's theory that customers value them less and the negotiated price would be lower),[153] SECURE will offset this loss in other ways. For example, I understand that SECURE has

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149 Harington Report, Appendix F.

150 Affidavit of Keith Blundell, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, March 25, 2022, ¶ 7.

151 See Section III.A.2 above. *See also* Affidavit of Robert Broen, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, March 24, 2022, ¶22, ["With a single company in SECURE with multiple facilities, if SECURE is full at one facility, it can optimize disposal at another facility and keep the cost down for the producer. For Athabasca Oil, having a single waste disposal provider with multiple facilities is preferrable [sic] to multiple providers with a less robust network of facilities."].

152 See Section IV.B.1 above.

153 Note that this is inconsistent with the fact, as noted above, that customers often have many locations and do not face different prices for delivering waste from each of these locations to a common waste services facility.

plans from the Transaction to improve service quality to customers at remaining facilities and to make the remaining facilities more efficient.[154] These plans are discussed in detail in the Engel Affidavit and certain examples are summarized below.[155]

a. [redacted]

b. E[redacted]

c. [redacted]

d. SECURE is able to redeploy assets from closing facilities to operating sites. This will result in improved facility throughout capacity and decreased costs.

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[154] The records that I have reviewed indicate that SECURE possessed superior customer service in comparison to Tervita prior to the Transaction. For example, [redacted]

[155] Engel Affidavit, ¶ 81.

[156] *See*, e.g., [redacted]

[157] [redacted]

e. SECURE and Tervita each had relative best practices at their facilities and with the Transaction are able to share these best practices and improve operational efficiency in different areas, including best practices for waste placement and leachate management, chemical injection, waste unloading, and landfill capping.

f. SECURE will achieve economies of scale benefits from increased volumes at remaining facilities post-Transaction. For example, the Transaction will allow for the construction of adjacent landfill cells, which increases the capacity over the same footprint, improving capital efficiency and reducing expenses.

g. SECURE will be able to more accurately assess its volumes at a landfill and optimize cell size and duration to lower its total costs.

h. SECURE is now able to pursue capital investment programs to reduce costs, which were not feasible for Tervita pre-Transaction.

i. SECURE plans to construct leachate pipelines between two nearby disposal facilities. SECURE estimates that doing so will allow it to save nearly all (95%) of the annual trucking costs it would have required for this disposal without the pipelines.[158]

IV.B.4. Dr. Miller's facility closure effect has no connection to the competitive harm he predicts from higher prices

133. I also note that Dr. Miller's asserted facility closure effect does not stem from predicted higher post-merger prices. Rather, the effect flows strictly from lost "value" to customers from SECURE's facility closures contemplated in its integration plan, as represented by SECURE's variable profits. As a result, Dr. Miller's facility closure effect is independent of whether a transaction would result in a substantial lessening of competition. To illustrate, in certain of his relevant markets, Dr. Miller predicts a price *decrease* from the Transaction, but nonetheless predicts a positive deadweight loss from a facility closure.[159] The total facility closure effect of $78 million is completely disconnected from, and does not arise by virtue of, any substantial lessening of competition. It only comes about as a result of the closure of facilities.

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[158] Harington Report, Section X.C.1.

[159] *See,* Miller Report backup, "Exhibit 30, 31, 32, 34, 35, 36.xlsx." For example, in the tab "Landfill," the first market listed has a predicted price change from the Transaction of -11% (i.e., a price decrease) and a facility closure effect (which he labels as a deadweight loss) of $895,116.

IV.C. Dr. Miller's facility closure effect (if any) is substantially overestimated

134. In this section, for completeness, I explain why Dr. Miller's facility closure effect is substantially overestimated (accepting, for argument's sake, that there could be a loss from facility closures).[160]

135. In particular, I outline several reasons why Dr. Miller's facility-level variable margins are not an accurate representation of consumer "value" of a facility, and therefore they overstate any facility closure effect.

IV.C.1. It is inconsistent with the evidence that incremental transportation costs account for less than 10% of Dr. Miller's purported facility closure effect

136. The proportion of the total facility closure effect accounted for by increased transportation costs also illustrates the flaw in Dr. Miller's assertion that facility-level variable margins are an appropriate representation of customer surplus. Out of the $78 million in lost value that Dr. Miller quantifies in facility-level variable profits, he quantifies one individual component: increased transportation costs for customers of the closed facilities who are currently using their closest facility and will thus face increased transportation costs post-Transaction.[161] He quantifies this component as between [redacted], or approximately [redacted] of his claimed facility closure effect.[162]

137. This result is inconsistent with the way Dr. Miller describes the industry throughout his report. Dr. Miller devotes most of his discussion on industry background to the implications of high

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[160] Note that Dr. Miller does not properly account for partial facility closures and thus overstates his facility closure effect. When adjusting for partial closures by multiplying Dr. Miller's facility level variable margin by only the revenues associated with aspects of the facility that are closing, $78 million decreases to $68 million. Throughout my report, I continue to refer to Dr. Miller's $78 million for clarity. See Workpaper 2.

[161] I note that to the extent some customers who do not currently use their closest facility divert to a more proximate facility post-Transaction, this would result in transportation cost savings for those customers.

[162] Note that Mr. Harington has done a similar calculation to Dr. Miller and he has reflected incremental transportation costs in the Harington Report as a negative efficiency.

In Appendix F to my report, I show the incremental distance and transportation costs that stem from the most recent facility closures in SECURE's integration plan, using the same approach as Dr. Miller. Counsel has asked me to perform this calculation, using Dr. Miller's approach, for the purpose of the incremental transportation cost calculation in the Harington Report.

transportation costs and the relevance of distance between facilities in firm pricing decisions.[163] He also illustrates the workings of his second-score model with reference only to transportation costs (though his model ultimately relaxes this assumption).[164] Seldom does he refer to, or provide any evidence of, the importance of other factors customers consider in choosing between facilities.

138. Dr. Miller makes numerous statements that suggest he views facility proximity and transportation costs as the most important drivers of facility choice, and hence also the most important determinants of customer value of a given facility:

   a. "I understand that transportation costs are one of the single-largest components of waste disposal costs for a producer."[165]

   b. "[C]ompany documents show that transportation costs are often a significant factor considered by the Parties when quoting disposal fees to customers."[166]

   c. "The locations of Secure, Tervita, and competitor facilities, confirms that Secure and Tervita are each other's closest competitors for many waste service customers."[167]

   d. "[T]ransportation costs comprise a significant portion of the customer's overall waste service costs, so the facility locations are an important driver of customers' choices."[168]

   e. "Transportation costs are a significant component of the total money oil and gas producers spend on waste services."[169]

139. Dr. Miller's assertion that facility variable margins are an appropriate representation of customer value is also inconsistent with the Commissioner's witness statements that transportation costs are an important determinant of facility choice. [redacted]

[163] Miller Report, Sections 3.3 and 3.4.

[164] Miller Report, Exhibits 19 and 20, and ¶ 123.

[165] Miller Report, ¶ 28.

[166] Miller Report, ¶ 30.

[167] Miller Report, ¶ 100.

[168] Miller Report, ¶ 107.

[169] Miller Report, ¶ 157.

[redacted]

140. While distance and transportation costs are observable and quantifiable, other factors customers may value are not, which explains why Dr. Miller only individually quantifies the increase in transportation costs component of his facility closure effect. Because other factors are not readily observable to SECURE when it is pricing, it is not practical that SECURE can observe a customer's willingness to pay at other facilities and price accordingly.[172]

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170 [redacted] *See also*, Affidavit of Chris Hogue, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, March 24, 2022, ¶ 8; Affidavit of Darren Gee, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, March 25, 2022, ¶ 9; Affidavit of Rodney Gray, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, March 25, 2022, ¶ 10.

171 [redacted]

172 Dr. Miller may argue that his logit model of customer demand is agnostic to the exact form of product differentiation. However, the parameters of his model are calibrated based on market shares and weighted

141. [redacted][173]

In effect, this is a principal-agent problem, and the implication is that in these instances the customer does not actually have control over where waste is delivered, so the revealed preference of the value of a facility is dictated by the driver who is not bearing the costs of the service.

142. The above evidence is inconsistent with Dr. Miller's claim that the full variable profits of facilities are, in reality, a reflection of customer value.

IV.C.2. Facility-level variable profits must cover more costs than the fixed cost savings quantified in the Harington Report

143. Setting aside my conclusion that no "value" will be lost as result of facility closures (because this is in conflict with SECURE's profit-maximizing decision to close facilities) I now show that, in any event, Dr. Miller's facility closure effect is greatly overstated.

144. Dr. Miller inappropriately represents the full amount of facility-specific variable profit as consumer surplus from the existence of the facility – i.e., a representation of how customers value the facility over another. Calling this consumer surplus suggests that the entirety of the facility-specific variable profit is margin that SECURE extracts from facility differentiation and its ability to price discriminate.

145. However, this is not the case in reality. Dr. Miller does not contemplate that facility variable profits must not only cover facility fixed costs that Mr. Harington quantifies as savings (i.e., avoided costs) from the Transaction, but also what Mr. Harington refers to as the "lifetime" costs of a facility.[174] Lifetime costs of a facility are capital costs that are not captured in the quantified facility-specific fixed cost savings in the Harington Report, but nonetheless are

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margins that mathematically have been constructed based on geographic markets defined solely around distances. As such, the differentiation that he alleges his model captures (see Miller Report, ¶123) is all grounded in distance between facilities, meaning this argument would not be internally consistent with Dr. Miller's framework.

173 [redacted]

174 Harington Report, Section XIII.

important considerations in understanding the profitability of a waste facility. These costs can be fixed in nature, or tied to volume.

146. Mr. Harington identifies a number of costs that he does not quantify as cost savings from the Transaction, but that would nonetheless be relevant to SECURE covering its lifetime costs at a facility.[175] The Engel Affidavit also notes that these costs are not captured in facility financials, but must be accounted for to capture the cost of constructing, owning, and operating a facility.[176]

   a. Upfront capital costs: Mr. Harington does not quantify upfront capital costs as they would not be saved with a facility closure.

   b. Periodic capital costs: Mr. Harington has not quantified these as savings as they are "affected by the volume into the facility" and are therefore variable costs in substance. Such costs are identified on the income statements as depletion. One example is periodic landfill capping costs and new cell construction costs, both of which are tied to the volume coming into the facility.

   c. End of life capital costs: These are end of life remediation costs, referred to as "asset retirement obligation" ("ARO"). Mr. Harington has not quantified ARO costs as savings as they are not lost with a facility closure (they are either sunk or variable in nature). These costs are not included on the facility income statements, but are calculated at a facility level and can be substantial.

147. As discussed earlier in Section II.C.2, the waste disposal firms must continue to monitor the waste since the liability of that waste remains with the customer permanently. This combined with the above evidence suggests that the margin that Dr. Miller claims is lost value from a facility closure is actually required, at least in part, to cover the lifetime costs of a facility, beyond those facility-specific fixed costs savings from the Transaction that are quantified in the Harington Report. As a result, Dr. Miller overstates his facility closure effect (even overlooking the fundamental contradiction in his economic logic, which as described above means there is actually no such effect at all).

[175] Harington Report, Section XIII.

[176] Engel Affidavit, ¶ 97.

IV.C.3. Value from differentiation between Tervita and SECURE at the company level, if any, is transferred and not lost from facility closures

148. Dr. Miller focusses on differentiation between individual facilities, regardless of the company that owns or operates the facility. This leads him to conclude that all value of a facility to a customer (as reflected in its variable margin) is lost when a facility closes. This ignores that this value may include what I would consider "reputational value" that is not tied to a specific facility but rather to a specific company, and the merged firm will have the combined "reputational value" of both companies post-Transaction.

149. Specifically, one important determinant of customer choice of waste services provider may be the reputation and overall sustainability of the company. Oil and gas producers are liable for appropriate handling and disposal of the waste they produce, and they remain liable even after it has been disposed of at a waste disposal facility. Waste disposal services, in other words, do not end after the truckload of waste is deposited – there is a long-term component involving the appropriate and sustainable management of that waste.[177]

150. To the extent that reputation is important to customers and some of this value is reflected in the variable facility margin that Dr. Miller claims, it will not be lost with facility closures as Dr. Miller claims. Oil and gas producers will continue to obtain waste services at nearby facilities, and these facilities will have the combined "reputational value" of SECURE and Tervita post-Transaction.

V. Proper estimation of deadweight loss from the Transaction and comparison to efficiencies

151. When a merger leads to higher prices, economic theory predicts that consumers will typically demand less of the good overall, leading to a deadweight loss (or allocative inefficiency). The

[177] *See,* e.g., Affidavit of Chris Hogue, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, March 24, 2022, ¶ 11; Affidavit of Rodney Gray, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, March 25, 2022, ¶ 10, 13-14; *See also,* Engel Affidavit, ¶ 82.

deadweight loss has two components, both stemming from the fact that fewer transactions between consumers and producers occur because of higher post-merger prices. The first component is lost consumer surplus, which represents loss from consumers who do not purchase at higher prices but would have purchased at pre-merger prices. The second component is lost producer surplus, which represents the lost producer margin on those same sales that do not occur with the merger but would have occurred without it.

152. In this section, I begin by discussing Dr. Miller's "illustrative calculations" of deadweight loss. His approach to these illustrative deadweight loss calculations follows the standard theory that higher prices lead to lower quantity demanded and a deadweight loss. This is in contrast to his facility closure effect, which does not stem from higher prices or lower quantity demanded. However, Dr. Miller's illustrative calculations are not consistent with his second-score auction model, because his model does not result in a quantity effect. I next turn to calculating the standard deadweight loss from the Transaction using a trade-off analysis with a linear demand assumption. Finally, I compare the deadweight loss estimates I have calculated to the efficiencies calculated in the Harington Report for particular hypothetical Tribunal orders, as instructed by Counsel.

V.A. Dr. Miller's "illustrative" deadweight loss calculations follow a standard approach but are inconsistent with the fact that his second-score auction model does not cause an output reduction

153. Dr. Miller presents what he refers to as "Illustrative calculations" of deadweight loss from customers reducing quantity demanded in the relevant markets he defines due to higher prices. I note that the methodology Dr. Miller employs for these calculations is a standard approach to estimating deadweight loss based on customer demand/quantity response (elasticity) to merger-induced price increases. He cites three possible causes for these reductions in quantity demanded following a price increase: (1) producers may switch to outside alternatives, like bioremediation, municipal landfills, etc.; (2) producers may decide to reduce their drilling

activity and drill fewer wells; and (3) the Orphan Well Association may remediate fewer legacy waste sites.[178]

154. Dr. Miller describes deadweight loss as follows: "Conceptually, the DWL represents the transactions that would create a surplus but are not realized because the supplier charges a higher price. The size of the DWL depends on the elasticity of demand, which captures how responsive customers are to a price change."[179] Notably, in his analysis of facility closure effects, his estimates of effects do not stem from higher prices or an elasticity of demand.

155. Dr. Miller's second-score auction model does not result in any deadweight loss from price increases (only an effect from facility closures). In other words, if SECURE was not electing to close facilities, Dr. Miller's model would produce no deadweight loss. This is because, in the second-score auction model, all transactions between buyers and sellers that would have occurred at lower prices pre-merger still occur at the higher prices post-merger. There is no "quantity effect" (i.e., reduction in total industry output) from higher prices in his model. The economic implication is that there is no deadweight loss and no loss in total surplus from the price increases in his model. Dr. Miller himself notes this in his auction model paper, stating "[t]he higher expected price that arises due to the merger represents a transfer of buyer utility to supplier profit. Because the identities of the selected suppliers are unchanged, the efficiency of the auction is unaffected."[180] Again, this is consistent with SECURE's integration plan, which has the same customer volumes being handled post-Transaction as pre-Transaction, only at different facilities.

156. It is unclear how Dr. Miller views his "illustrative calculations" of deadweight loss in the context of his auction model.

157. Irrespective of the disconnect between his auction model and his "illustrative calculations" of deadweight loss, Dr. Miller's "illustrative calculations" do estimate deadweight loss using a standard approach based on customer demand/quantity response (elasticity) to merger-

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[178] I note that a SECURE customer affidavit from Athabasca Oil states, "As a practical matter, the cost of waste disposal does not factor at all into Athabasca Oil's decisions to drill oil wells or increase production at existing wells." *See,* Affidavit of Robert Broen, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, March 24, 2022, ¶ 15. *See* also, Affidavit of Chris Hogue, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, March 24, 2022, ¶ 16.

[179] Miller Report, ¶ 161.

[180] Nathan H, Miller, "Modeling the effects of mergers in procurement", International Journal of Industrial Organization 37 (2014): 201-208, 204.

induced price increases. Dr. Miller does not estimate the demand elasticity; rather, he uses a calculation from the expert report of Dr. Kahwaty from Tervita's prior acquisition of Complete (which was conducted approximately 10 years ago based on a financial projection for one facility) as part of a range of assumed elasticities from -0.2 to -0.87.[181] His analysis produces deadweight loss estimates of $0.5 to $2.4 million for landfill waste and $0.5 to $2.0 million for waste water.[182] Dr. Miller does not present an illustrative calculation for TRD/FST services outside of waste water.

V.B. The Section 96 trade-off analysis for various remedy scenarios

158. Counsel has requested that I estimate deadweight loss from the Transaction and compare it to the efficiencies from the Transaction calculated in the Harington Report. In the alternative, Counsel has also asked that I estimate deadweight loss in the areas applicable to hypothetical divestiture orders under Section 92 for the purpose of presenting the trade-off against the efficiencies lost from those hypothetical orders.

159. In particular, Counsel has requested that I consider two hypothetical orders:

    a. An order to divest the 40 unique Tervita facilities identified in Exhibits 23 to 30 of Dr. Miller's report from the Commissioner's s. 104 Application Record ("Hypothetical Divestiture Option 1").[183]

    b. An order to divest 25 unique Tervita facilities that are in "2-to-1" and "3-to-2" markets in Dr. Miller's Report from this Transaction ("Hypothetical Divestiture Option 2").

160. The Tervita facilities in each Hypothetical Divestiture Option are listed in the Harington Report at Appendix C.

161. I adopt Dr. Miller's relevant markets for the purpose of this deadweight loss analysis, of which there are 271 in total."[184]

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[181] Miller Report backup, "Workpaper 16.xlsx."

[182] Miller Report backup, "Workpaper 16.xlsx." Dr. Miller's estimates of deadweight loss to the Orphan Well Association from price increases associated with landfilling are also inconsistent with the fact that the second-score auction model does not result in an output effect.

[183] Application Record, pp. 2772-2779.

[184] Miller Report backup, "Exhibit 09.xlsx." Dr. Miller's relevant markets are broken down as follows: 95 TRD, 148 WD, and 28 LF; and 19 "2-to-1," 40 "3-to-2," and 212 "4-to-3 or more."

162. Because Dr. Miller's relevant markets may contain multiple Tervita facilities in a single market, I have to decide which markets are "resolved" by the divestiture of a particular facility and thus included in the total deadweight loss for the Hypothetical Divestiture Option. I consider two alternatives:

    a. The first alternative, which I call the "Relevant Facilities" approach, considers a market's total deadweight loss to be resolved if any one (or more) Tervita facilities applicable to the Hypothetical Divestiture Option are in that market (using Dr. Miller's list of "relevant facilities" for each market). For example, if a market has 4 Tervita facilities and one of them is among the 40 Tervita facilities in Hypothetical Divestiture Option 1, then the full amount of that market's deadweight loss would be included in the total deadweight loss for Hypothetical Divestiture Option 1. This is conservative, because it assumes the divestiture of even a small proportion of Tervita's presence in the market would resolve all deadweight loss in the market.

    b. The second alternative, which I call the "Closest Facility" approach, considers a market's total deadweight loss to be resolved if the closest Tervita facility to customers in the market is applicable to the Hypothetical Divestiture Option (using Dr. Miller's list of "closest facilities" for each market). For example, if a market has 4 Tervita facilities and one of them in among the 40 Tervita facilities in Hypothetical Divestiture Option 1, then the full amount of that market's deadweight loss would be included in the total deadweight loss for Hypothetical Divestiture Option 1 *if* that facility is the "closest facility" to customers.

163. Counsel has asked me to estimate deadweight loss on an annual basis, and also to convert this to a 10-year net present value using the same methodology as the Harington Report. I do this conversion for the purpose of the trade-off only, and I do not opine that price effects and/or deadweight loss are likely to continue at the same level for this full period (for example, entry or expansion by potential competitors is more likely to occur on a longer term basis than a short term basis).

V.C. Deadweight loss is calculated using a standard approach

164. Using a standard approach of calculating surplus changes based on areas under the demand curve and above the variable cost, the deadweight loss calculation for a particular market involves four key inputs: market demand elasticity, producer variable profit margin, total

market revenues, and the predicted price increase.[185] I will describe each in turn, along with the sources I have relied on to estimate them.

165. Market demand elasticity is a measure of consumer responsiveness to prices changes. All else being equal, as demand becomes more elastic (inelastic), a given price increase would lead to a higher (lower) change in quantity and thus higher (lower) deadweight loss. I rely on the demand elasticity quantified in the Affidavit of Professor Adonis Yatchew (the "Yatchew Report"). In particular, Professor Yatchew finds a "reasonable range for the market elasticity is from close to [redacted], and more likely at the lower end."[186] He also finds that "[d]irect estimates of elasticities by service group produced values of [redacted] for LF, [redacted] for FST and [redacted] for WD. None of these are statistically significantly different from zero." [187] For purposes of my baseline deadweight loss estimates below, I use the three service group values as a baseline. I also consider the overall demand elasticity estimate of [redacted] as an alternative.

166. Producer variable profit margin is the revenue weighted average percentage variable margin for SECURE and Tervita facilities in the relevant area. For the purpose of my calculations, for simplicity, I rely on Dr. Miller's facility- and market-level variable margins for SECURE and Tervita facilities.[188]

167. Total revenues represent the combined annual sales of all participants in the relevant market. I use Dr. Miller's estimates of total party revenue and market shares to derive an implied total market size estimate, including competitors.

168. Predicted price increases are based on the Tervita/Newalta natural experiment described above. In particular, I find baseline price effects of 11% for "2-to-1" markets, 9.8% for "3-to-2" markets, and 0.9% for "4-to-3 or more" markets. I also consider price effects from an alternative specification of my analysis, as described below.

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[185] Consumer deadweight loss is calculated as $Consumer\ DWL = \frac{1}{2} \times \%\Delta P^2 \times \varepsilon \times R$ and producer deadweight loss is calculated as $Producer\ DWL = \%M \times \%\Delta P \times \varepsilon \times R$, where %ΔP is the percentage price increase from the merger, ε is the market demand elasticity, R is the pre-merger total market revenues, and %M is the percentage margin. These formulas are exact for the case of linear demand and constant marginal costs, and otherwise provide a "first-order" approximation to arbitrary demand and cost curves.

[186] Affidavit of Adonis Yatchew, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, March 25, 2022, ¶ 19 ("Yatchew Report").

[187] Yatchew Report, ¶ 17.

[188] Note that, as discussed in Section IV.C.2, to the extent that Dr. Miller has overestimated variable margins for certain facilities (e.g., by failing to include certain variable costs) this would make my deadweight loss estimates conservative.

169. Figure 20 below summarizes total deadweight loss for the full Transaction (i.e., across all of Dr. Miller's relevant markets), as well as for each of Hypothetical Divestiture Option 1 and Hypothetical Divestiture Option 2, with (a) based on the "Relevant Facilities" approach and (b) based on the "Closest Facilities" approach. I show deadweight loss on an annual basis and then convert these figures to a 10-year net present value using the same discounting approach as applied to the efficiencies in the Harington Report.

FIGURE 20: DEADWEIGHT LOSS BY HYPOTHETICAL DIVESTITURE OPTION (BASED ON 2019)

Remedy Option		Remedy Description [A]	Annual [B]	10-Year NPV [C]
Transaction		Full Transaction	$1,615,645	$11,266,415
Divestiture Option 1(a)	[1]	40 Tervita Facilities (Relevant Facilities)	$1,588,289	$11,075,648
Divestiture Option 1(b)	[2]	40 Tervita Facilities (Closest Facility)	$1,239,033	$8,640,175
Divestiture Option 2(a)	[3]	25 Tervita Facilities (Relevant Facilities)	$1,586,058	$11,060,095
Divestiture Option 2(b)	[4]	25 Tervita Facilities (Closest Facility)	$1,306,894	$9,113,395

Sources:

Miller Report backup, "Exhibit 9.xlsx;" Elasticities based on service group values from the Yatchew Report; Predicted price effects based on Tervita/Newalta natural experiment.

Notes:

Deadweight loss is estimated at the level of Dr. Miller's relevant markets and then aggregated over those markets applicable to each hypothetical remedy. The total deadweight loss in a market is always used even when the remedy involves divestiture of less than all Tervita facilities in the market. Deadweight loss is based on baseline inputs: Dr. Miller's variable margins, Dr. Miller's total market revenues and market shares, service group elasticities from the Yatchew Report, and price effects from the Tervita/Newalta natural experiment.

170. I also calculate the same deadweight loss scenarios using reasonable alternative inputs for demand elasticity (again based on the Yatchew Report) and price effects (based on an alternative specification of my natural experiment analysis).

a. Using the same baseline inputs described above and reflected in the analysis in Figure 20, but using an overall demand elasticity of [redacted] (representing the conservative end of the overall range of [redacted] estimated by Professor Yatchew), the annual Full Transaction deadweight loss estimate becomes $1.9 million.

b. Again starting with the baseline inputs, but now using price effects from an alternative specification of my natural experiment analysis (which yields price effects of 6.4% for "2-to-

1" markets, 5.7% for "3-to-2" markets, and 2.1% for "4-to-3 or more" markets),[189] the annual Full Transaction deadweight loss estimate becomes $1.9 million.[190]

171. On this basis, I find that the results are robust to a reasonable range of assumptions with regards to elasticities and price effects (and the remaining inputs are based on Dr. Miller's analysis). To the extent demand is at the more inelastic end of the range in the Yatchew Report (i.e., near zero), deadweight loss would be lower than as presented here.

172. These results differ from Dr. Miller's "illustrative calculation" for several reasons, some of which directionally increase my deadweight loss estimates compared to his and some of which directionally decrease them:

a. I calculate deadweight loss for individual relevant markets for the Hypothetical Divestiture Options, whereas Dr. Miller's illustrative calculation presents one deadweight loss estimate over all facilities of a particular type. Relatedly, I use total market size within the relevant market (including estimates of competitor volume), whereas Dr. Miller's illustrative calculation uses the Parties' total revenues for a facility type; and I apply Dr. Miller's facility-level weighted average margins to the relevant markets, whereas Dr. Miller uses an estimate of overall average margin for the facility type.

b. I include deadweight loss for TRDs/FSTs (as well as LFs and WDs), whereas Dr. Miller only includes deadweight loss for LFs and waste water services at WDs and TRDs/FSTs (but not other waste services at TRDs/FSTs).

c. I use the elasticity estimates of Professor Adonis Yatchew, whereas Dr. Miller uses a range of assumed elasticities, including the estimate of Dr. Henry Kahwaty from his expert report in the CCS matter.

d. I use my predicted price increases from the Tervita/Newalta natural experiment, whereas Dr. Miller uses his overall average price effect of approximately 12% for his calculations for both LFs and waste water services.[191]

e. I correct an error in Dr. Miller's calculation of lost producer surplus – what he calls the "rectangle" – which caused him to underestimate lost producer surplus.

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[189] See Figure 27 in Appendix D.

[190] See Appendix G for summary tables of deadweight loss results under these alternatives.

[191] Note that Dr. Miller's overall average price effect of 12% is much larger than the overall average price effect of 3.1% that would be predicted from applying my Tervita/Newalta natural experiment analysis to the current transaction. This overall average is calculated by applying the estimated Tervita/Newalta merger price effects to the current transaction on a market-by-market basis (based on the corresponding market-structure change) and then averaging (weighted by revenues) across all markets. See my Workpaper 3.

V.D. The efficiencies exceed the deadweight loss in all cases

173. In this section, I present the trade-off by comparing the deadweight loss estimates above to the efficiencies calculated in the Harington Report on a 10-year net present value basis for each of the Hypothetical Divestiture Options.

174. Figure 21 below presents the trade-off under Hypothetical Divestiture Option 1 and Hypothetical Divestiture Option 2. As shown, the efficiencies significantly exceed the deadweight loss for the Transaction as a whole and in addition, the lost efficiencies exceed the deadweight loss for each Hypothetical Divestiture Options in all cases.[192]

FIGURE 21: COMPARISON OF DEADWEIGHT LOSS TO EFFICIENCIES FOR EACH HYPOTHETICAL DIVESTITURE OPTION, 10-YEAR NPV

Remedy Option		Deadweight Loss 10-Year NPV ($M) [A]	Efficiencies 10-Year NPV ($M) [B]
Transaction		$11.3	[redacted]
Divestiture Option 1	[1]	$8.6 to $11.1	
Divestiture Option 2	[2]	$9.1 to $11.1	

Sources: Figure 20 and Harington Report, Table 1 and Table 2.

Notes:
Range of deadweight loss for Divestiture Options based on "Closest Facility" and "Relevant Facilities" approaches shown in Figure 20 for the baseline. Range of efficiencies based on "Date of Closing Approach" and "Tribunal Order Date Approach" as described in the Harington Report.

Efficiencies for the Transaction represent the full Transaction efficiencies, shown in the Harington Report, Table 1. Efficiencies for the Divestiture Options are those lost from the applicable Divestiture Option, shown in the Harington Report, Table 2.

[192] For market-level deadweight loss estimates, see my backup to Figure 20.

Appendix A: Curriculum Vitae of Renée M. Duplantis

Renée M. Duplantis

PRINCIPAL

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Dr. Renée Duplantis is the leader of Brattle's Canadian Competition Practice, and a former T.D. MacDonald Chair in Industrial Economics (Chief Economist) at the Canadian Competition Bureau.

Dr. Duplantis has nearly 20 years of experience involving complex competition matters in Canada, the United States, and Europe. She has testified before the Canadian Radio-television and Telecommunications Commission and has authored reports and presented findings to competition agencies globally, including the Canadian Competition Bureau, the US Federal Trade Commission, and the European Commission Directorate-General for Competition and the Chief Economist Team.

Dr. Duplantis specializes in the empirical analysis of competition issues, with a primary focus on quantifying the competitive effects of mergers. She has also been engaged on several competition matters involving allegations of abuse of dominance, exclusionary conduct, monopolization, collusion, and price-fixing.

Prior to joining Brattle, Dr. Duplantis spent almost five years at the Canadian Competition Bureau in various positions, including as the Chief Economist. During this time, she advised the Commissioner of Competition on economic matters related to competition policy, and participated in the economic analysis of numerous high-profile investigations under the *Competition Act* involving mergers, abuse of dominance investigations, and criminal matters.

Dr. Duplantis is recognized as a thought leader and leading competition economist by *Who's Who Legal*, serves as an active non-governmental advisor (NGA) for the Competition Bureau in the International Competition Network, is a member of the C.D. Howe Competition Policy Council, and is a frequent speaker at competition conferences globally.

AREAS OF EXPERTISE

- Antitrust & Competition

EDUCATION

- **Northeastern University**
  PhD in Economics
- **Duke University**
  MA in Economics
- **University of Louisiana at Monroe**
  BBA in Economics

PROFESSIONAL EXPERIENCE

- **The Brattle Group (2015–Present)**
  Principal
- **Microeconomic Consulting and Research Associates, Inc. (MiCRA) (January–May 2015)**
  Principal
- **Competition Bureau Canada (2010–2014)**
  T.D. MacDonald Chair in Industrial Economics (2014)
  Special Economic Advisor (2011–2013)
  Competition Law Officer (2010–2011)
- **Microeconomic Consulting and Research Associates, Inc. (MiCRA) (2003–2011)**
  Senior Economist
- **IBM Business Consulting Services (including its predecessor, the Washington Consulting Practice of PricewaterhouseCoopers) (2001–2003)**
  Senior Consultant

EXPERT TESTIMONY

- **Canadian Radio-television and Telecommunications Commission**
  Testified on behalf of the Competition Bureau at Broadcasting Notice of Consultation 2014-190 “Let’s Talk TV” hearing (September 8, 2014)

SELECTED CONSULTING EXPERIENCE

For nearly 20 years, I have been providing economic consulting services in numerous industries. The list of selected experience included below does not include active engagements or past

engagements where my involvement was not in the public domain, is not known by other parties involved, and/or for which authorization to disclose my involvement has not been provided by clients.

MERGER ANALYSIS

- Provided written and oral presentations to the US Federal Trade Commission on the economic implications of an acquisition in the propane industry.
- Retained as the outside expert by Paper Excellence Canada Holdings Corporation in connection with the acquisition of the pulp production business of Catalyst Paper Corporation.
- Provided written and oral presentations to the Competition Bureau on the economic implications of an acquisition in the retail crop inputs industry.
- Provided written and oral presentations to the Competition Bureau on behalf of Superior Plus LP in connection with its acquisition of the retail propane distribution business of Gibson Energy ULC (Canwest Propane), which involved empirically estimating the anti-competitive effects of the merger and conducting the Section 96 trade-off analysis.
- Provided written submissions to the Competition Bureau on behalf of Agrium, Inc. in the review of its merger with PotashCorp of Saskatchewan, which involved empirically estimating the anti-competitive effects of the merger and conducting the Section 96 trade-off analysis.
- Provided oral submissions to the Competition Bureau on behalf of Cintas Corporation in its acquisition of G&K Services Inc.
- Provided oral and written submissions to the Competition Bureau on behalf of BCE, Inc. in its acquisition of Manitoba Telecom Systems Inc.
- Provided oral submissions to the Competition Bureau on behalf of Superior Plus Corporation in its proposed acquisition of Canexus Corporation.
- Retained as the outside expert for the Competition Bureau in its review of an acquisition in the insulated metal panels industry.
- Retained by one of the merging parties to provide consulting services in the review of acquisitions in the following industries:
    - Retail gas
    - Food products
    - Funeral homes
    - Oil and gas
    - Car rentals
    - Cement
    - Natural gas pipelines
    - Passenger airlines
    - Heavy equipment
    - Propane (wholesale and retail)
    - Public exchange
    - Landfills and bioremediation

- *Commissioner of Competition v. Tervita (CCS Corporation)*

  While seconded to the Competition Bureau, served as the Bureau's internal economist on its review of the acquisition of a hazardous waste landfill in northeastern British Columbia. This work included developing theories of harm, empirically estimating the anti-competitive effects from the merger, calculating the deadweight loss associated with the transaction, and assisting with testimony before the Competition Tribunal. It also involved assisting with the Bureau's submissions before the Federal Court of Appeal and the Supreme Court of Canada.

- While seconded to the Competition Bureau, led the analysis of competitive effects for merger investigations in the following industries:
  - Grocery retailing
  - Fertilizer manufacturing and retailing
  - Newspapers
  - Cement
  - Fast food retailing
  - Oriented strand board production
  - Milk production
  - Armoured car services
  - Broadcasting
  - Telecommunications
  - Sports and entertainment
  - Lumber
  - Car rental
  - Equities trading and post-trade clearing services
  - Upstream oil and gas
  - Consumer auto products
  - Mining consumables
  - Construction rental equipment
- In support of another expert, led the analysis of competitive effects for merger investigations in the following industries:
  - Retail chains
  - Grocery retailing
  - Hotels
  - Drug manufacturing
  - Roofing materials
  - Hospital transport
  - Eyeglass and sunglass retailing and manufacturing
  - Passenger air travel
  - Newspapers
  - Newsprint production
  - Nitrogen-based fertilizers
  - Paint and chemical manufacturing
  - Beer manufacturing
  - Satellites
  - Asphalt and aggregates
  - Search engines and advertising
  - Bioremediation

ABUSE OF DOMINANCE/MONOPOLISTIC PRACTICES

- Provided oral and written submissions to the Directorate-General and the Chief Economist Team of the European Commission Directorate-General for Competition in an abuse of dominance matter.
- *Commissioner of Competition v. Toronto Real Estate Board*

  While seconded to the Competition Bureau, served as the Bureau's internal economist on its review of rules implemented by Canada's largest real estate association regarding the use of MLS data on virtual office websites and its application to the Competition Tribunal under the abuse of dominance provision of the *Competition Act*. This work included developing theories of harm and assisting with testimony before the Tribunal.
- While seconded to the Competition Bureau, served as the internal economist on civil investigations involving the following industries:
  - Broadcasting
  - Professional sports leagues
  - Grocery retailing
  - Search advertising and optimization
  - Waste collection
- *L-3 Communications v. Lockheed Martin*

  Led the support of an expert testifying on the liability aspect of monopolization and foreclosure in the antisubmarine warfare aircraft refurbishment industry.

PRICE FIXING

- Provided oral and written submissions to the Competition Bureau on behalf of a defendant in an alleged price-fixing matter.
- *Horizon Sports v. Newport Adhesives*

  Led the empirical support of an expert testifying on the estimated overcharge resulting from the price fixing of carbon fiber.
- *In re: USF Telephone Billing Practices Litigation*

  Led the support of an expert testifying on behalf of the defendants in the alleged price fixing of the universal service fees.
- Led the empirical support of an expert analyzing the competitive effects of an alleged agreement in the following industries:
  - Parcel-tanker shipping (Canada)
  - Air cargo (US and Europe)
  - Maritime shipping (US)

EXPERT REPORTS IN REGULATORY MATTERS AND OTHER VENUES

- "Valuing an Accelerated Clearing of the C- Band Spectrum in Canada," with Coleman

Bazelon and Paroma Sanyal, prepared on behalf of Intelsat in the Government of Canada, in the Consultation on the Technical and Policy Framework for the 3650-4200 MHz Band and Changes to the Frequency Allocation of the 3500-3650 MHz Band (August 2020)

- "Reply to the Report of Zhiqi Chen: 'Assessment of an Expert Report by The Brattle Group Regarding Telecom Order CRTC 2019-288,'" with Agustin J. Ros, Dimitri Dimitropoulos, and Ian Cass, prepared for Bragg Communications Inc. (c.o.b. Eastlink), Cogeco Communications Inc., Rogers Communications Canada Inc., Shaw Cablesystems G.P., and Videotron Ltd., in the Application for Review and Variance and a Stay of Telecom Order CRTC 2019-288 (March 13, 2020)
- "Analysis of CRTC's Final Rates for Aggregated Wholesale High-Speed Access Services: Impact on Broadband Network Investment and Innovation," with Agustin J. Ros, Dimitri Dimitropoulos, and Ian Cass, prepared for Bragg Communications Inc. (c.o.b. Eastlink), Cogeco Communications Inc., Rogers Communications Canada Inc., Shaw Cablesystems G.P., and Videotron Ltd., in the Petition to the Governor in Council pursuant to Section 12 of the *Telecommunications Act* Re: Telecom Order CRTC 2019-288 and in the Application for Review and Variance and a Stay of Telecom Order CRTC 2019-288 (November 13, 2019)
- Submitted a confidential expert report for mediation on behalf of plaintiffs in a civil matter against the Government of Canada and the Government of Ontario related to the justice system (December 10, 2018)
- "An Analysis of Broadband Services in Canada; Competition, Regulation, and Investment," with Coleman Bazelon and Agustin J. Ros, prepared for Shaw Communications Inc., in the Competition Bureau Market Study: Competition in Broadband Services (August 30, 2018)

ARTICLES & PUBLICATIONS

- "Trends in Consumer Shopping Behavior and Their Implications for Retail Grocery Merger Reviews," with Dimitri Dimitropoulos and Loren K. Smith, *Competition Policy International Antitrust Chronicle* (December 2021)
- "The Canadian Competition Bureau and Big Data: Interview with Renée Duplantis, PhD, former TD MacDonald Chair in Industrial Economics at the Competition Bureau," with Zirjan Derwa, *Competition Law International,* 15(2), pp 149–152 (December 2019)
- "The Importance of Quantifying Non-Price Effects in Canada," with Ian Cass, *Concurrences Review*, No. 2, pp. 51–57 (2017)
- "Economic Analysis of Retail Mergers at the Competition Bureau," Competition Bureau White Paper (September 14, 2014)
- "Do Mergers Among Publishers of Academic Journals Affect Prices?," working paper (2010)

- "Pass-through of Non-sunk Fixed Costs with an Application to Fuel Costs," working paper (2010)
- "Merger Effects in Markets for Highway Construction," working paper (2010)
- "From Structure to Effects: the Economics of Merger Control," with R. S. Khemani and R. Warren-Boulton, *Global Competition Review* (June 2008)

PRESENTATIONS & SPEAKING ENGAGEMENTS

MERGER ANALYSIS

- "Vertical Mergers – Economic Perspectives and Practical Guidance" (moderator), Canadian Bar Association Teleconference (December 8, 2021)
- "Opening the Black Box – The Inside Scoop on Competition Bureau Merger Reviews," Canadian Bar Association, 2021 Annual Fall Competition Law Symposium (October 18, 2021)
- "Economic Issues in an Increasingly Progressive Merger Enforcement Environment," Fordham Competition Law Institute International Antitrust Law & Policy Conference (September 29, 2021)
- "Econometrics and Modeling for Mergers Globally" (moderator), Fordham Competition Law Institute International Antitrust Law & Policy Conference (October 7, 2020)
- "The Impact of COVID-19 on Merger Control," Canadian Bar Association Teleconference (April 8, 2020)
- "Merger Control in the Face of COVID-19," White & Case Teleconference (March 31, 2020)
- "The Future of the Efficiencies Defense in Canadian Competition Law," Canadian Economic Association Meetings, Banff, AB (June 2, 2019)
- "ARC Requests and Market Definition 101," Canadian Bar Association Young Lawyers and Mergers Committee Teleconference (December 18, 2018)
- "From market shares and form-based approach to unilateral effects in innovation and Intel – 15 years of competition economics," Association of Competition Economists, Bologna, Italy (November 15, 2018)

- "Evidentiary Standards in Mergers with Innovation," International Competition Network Merger Workshop, Breakout Session, Tokyo, Japan (November 8, 2018)
- "Non-Price Effects in Competition Analysis: Fact or Fiction?" Canadian Bar Association, 2016 Annual Fall Competition Law Conference, Ottawa, ON (October 6, 2016)
- "Mergin' On Up: Current Issues in Vertical Transactions," American Bar Association/ Canadian Bar Association Brownbag Teleconference (May 25, 2016)
- "Non-price Effects in Competition Assessment"(moderator), Competition Bureau Emerging Competition Issues Workshop, Ottawa, ON (January 18, 2016)
- "A New World Order? Implications of the Supreme Court's Decision in *Tervita* for Mergers?" Canadian Bar Association, 2015 Annual Fall Competition Law Conference, Ottawa, ON (October 2, 2015)
- "The Relationship between Competition and Innovation," Competition Bureau Innovation and Antitrust Workshop, Ottawa, ON (November 4, 2014)
- "Issues in the Retail Environment," Canadian Bar Association, 2014 Annual Fall Competition Law Conference, Ottawa, ON (September 18, 2014)
- "The Use of Econometric Data in Merger Review," American Bar Association International Section of Law / International Association of Young Lawyers Conference, Chicago, IL (June 7, 2014)
- "Challenges in Merger Review: Price Discrimination," Canadian Economic Association Meetings, Vancouver, BC (May 30, 2014)
- "Structural Approaches vs. Competitive Effects – How the Canadian Competition Bureau Strikes a Balance," Keynote Address, Canadian Bar Association Roundtable Event: Meet the Competition Bureau Economists, Toronto, ON (April 3, 2014)
- "Quantitative Methods for Competition Analyses," with Dennis Lu, Presentation to the Mergers Branch, Gatineau, QC (May 22, 2013)
- "Bureau's Use of Econometrics in Merger Cases," Competition Bureau/Canadian Bar Association Mergers Roundtable, Toronto, ON (May 10, 2013)

- "Econometric Tools in Merger Reviews," with Dennis Lu and Patrick Hughes, Presentation to the Commissioner of Competition, Gatineau, QC (February 6, 2013)
- "The Rough Guide to the *Commissioner of Competition v. CCS et al*.," with Nikiforos Iatrou and Trevor MacKay, Competition Bureau Town Hall, Gatineau, QC (February 23, 2012)

ABUSE OF DOMINANCE/MONOPOLISTIC PRACTICES

- "Monopoly Games: Moving past populist rhetoric to a digital competition policy that serves innovators and consumers," MacDonald-Laurier Institute Panel (June 10, 2021)
- "Economic Issues Involving Platforms, Privacy and the Digital Economy" (co-moderator), Canadian Bar Association Teleconference (February 16, 2021)
- "Abuse of Dominance Comes in for a Landing: The State of s.79 Following VAA and TREB," Canadian Bar Association Teleconference (January 17, 2020)
- "Competition Issues Involving Vertical Unilateral Conduct," Canadian Bar Association Teleconference (November 21, 2019)
- "Abuse of Dominance in a Changing World," Canadian Bar Association, 2019 Annual Spring Competition Law Conference, Toronto, ON (May 7, 2019)
- "TREB, AMEX and the Future of Monopolization in Data-Driven Markets," Canadian Bar Association, 2018 Annual Fall Competition Law Conference, Ottawa, ON (September 27, 2018)
- "Vertical Restraints in Online Markets," International Competition Network Annual Meeting, Breakout Session, Singapore (April 27, 2016)

ECONOMICS/OTHER COMPETITION ISSUES

- "Digital Strategy of Competition Agencies," International Competition Network Annual Meeting, Agency Effectiveness Working Group plenary session (September 15, 2020)
- "Economics of Antitrust Analysis and Policy: The Relevance of Gender," American Bar Association Antitrust Law Section Panel, Washington, DC (November 19, 2019)
- "Integrating Economics in Case Assessments – Lessons Learned from Experience" (moderator), International Competition Network Annual Meeting, Breakout Session, New Delhi, India (March 22, 2018)

- "Expanding the Right of Private Access," Canadian Economic Association Meeting, Antigonish, NS (June 3, 2017)
- "Economists of Scale and Scope – the Role of Expert Economists for Effective Enforcement," International Competition Network Annual Meeting, Breakout Session, Porto, Portugal (May 12, 2017)
- "Economists and the ICN," International Competition Network Chief/Senior Economists Workshop, Vancouver, BC (September 13, 2016)
- "Economists and the ICN," International Competition Network Annual Meeting, Breakout Session, Singapore (April 27, 2016)
- "Notification in Aisle 5: A Cross-Border Survey of Econometric Trends and Tools," American Bar Association / Canadian Bar Association Brownbag Teleconference (April 21, 2014)
- "Managing Economics Experts," Presentation to the Competition Bureau, Gatineau, QC (2012, 2014)

LECTURES

- Guest lecturer in Ivey Business School at Western University Microeconomics Course, London, ON (2016–2021)
- Guest lecturer in Northeastern University Industrial Organization Doctoral Course, Boston, MA (2016, 2018, 2020)
- Guest lecturer in Western University Industrial Organization Honours Course, London, ON (2013–2016)
- Guest lecturer in York University, Osgoode Hall Law School Competition Course, Toronto, ON (2014, 2020, 2021)
- "The Economics of Cartels," Competition Bureau Basic Industrial Organization Course, Gatineau, QC (2014)

SELECTED HONORS & AWARDS

2021–2022 *Who's Who Legal: Thought Leaders – Competition*
2018–2021 *Who's Who Legal: Competition Economists*
2018–2021 *Who's Who Legal: Consulting Experts*
2017–2021 *Who's Who Legal: Canada*

2017	*Who's Who Legal: Competition – Future Leaders – Economists*
2015	Deputy Minister Merit Award Winner, Competition Bureau
2014, 2015	Commissioner Merit Award Winner, Competition Bureau
2011, 2013	Commissioner Merit Award Finalist, Competition Bureau
2011–2015	Deputy Commissioner Merit Award Winner, Competition Bureau

PROFESSIONAL ASSOCIATIONS & MEMBERSHIPS

- Competition Policy Council, C.D. Howe Institute (2016–present)
- Non-governmental Advisor to the International Competition Network, Competition Bureau Canada (2015–present)
- *Canadian Competition Law Review*
  - Editor-in-Chief (2020–2021)
  - Editorial Board (2015–2021)
- Affiliate member, Canadian Bar Association
- Associate member, American Bar Association

CITIZENSHIP

- Canada
- United States

Appendix B: Documents relied upon

Below is a list of documents I relied upon in preparing my report. For completeness, I relied on all files cited in my report and used in my backup (Exhibit 1).

CASE MATERIALS

Affidavit of Adonis Yatchew, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, March 25, 2022.

Affidavit of Chris Hogue, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, March 24, 2022.

Affidavit of Darren Gee, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, March 25, 2022.

Affidavit of David Engel, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, March 25, 2022.

Affidavit of Keith Blundell, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, March 25, 2022.

Affidavit of Robert Broen, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, March 24, 2022.

Affidavit of Rodney Gray, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, March 25, 2022.

Expert Report of Andrew C. Harington, “Productive Efficiencies Arising from the Acquisition of Tervita Corporation,” Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, March 25, 2022.

Expert Report of Nathan H. Miller, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, February 25, 2022 [Including all materials in his backup production].

s.104 Application Record, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, June 29, 2021.

Witness Statement of Aqua Terra Water Management, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, February 2022.

Witness Statement of Aquaterra Utilities, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, February 21, 2022.

Witness Statement of Chad Hayden (Galatea), Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, February 9, 2022.

Witness Statement of Cliff Swadling (Obsidian Energy Ltd.), Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, February 21, 2022.

Witness Statement of ConocoPhillips, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, February 23, 2022.

Witness Statement of Green Impact Partners Inc., Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, February 25, 2022.

Witness Statement of Halo Exploration Ltd., Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, February 24, 2022.

Witness Statement of Jeffrey Biegel, (SHARP Environmental (2000) Ltd.), Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, February 15, 2022.

Witness Statement of LB Energy Services Ltd., Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, February 23, 2022.

Witness Statement of Paul Dziuba (Chevron Canada Resources), Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, February 24, 2022.

Witness Statement of RemedX Remediation Services Inc., Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, February 7, 2022.

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Alberta Energy Regulator. "Waste Management." https://www.aer.ca/providing-information/by-topic/waste-management.

Bott, Robert D. "Evolution of Canada's oil and gas industry." *Canadian Centre for Energy Information*. 2004. http://www.energybc.ca/cache/oil/www.centreforenergy.com/shopping/uploads/122.pdf.

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Petroleum Services Association of Canada. "Oil & Gas Industry Overview." https://www.psac.ca/business/oil-and-gas-industry-overview/.

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SECURE. "SECURE Energy – Annual Information Form – For the year ended December 31, 2020." February 25, 2021. https://f.hubspotusercontent10.net/hubfs/6144363/pdfs/secure-energy-2020-aif.pdf.

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Tervita. "Newalta and Tervita Agree to Merge to Create the Leading Energy-Focused Environmental Solutions Provider in Canada." March 1, 2018. https://tervita.com/news/article/newalta-and-tervita-agree-to-merge-to-create-the-leading-energy-/.

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Peters, Craig. “Evaluating the performance of merger simulation: Evidence from the US airline industry.” *The Journal of Law and Economics* 49(2) 2006: 627-649.

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Weinberg, Matthew C. "More Evidence on the Performance of Merger Simulations." *American Economic Review* 101(3) 2011: 51-55.

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[redacted]

[redacted]

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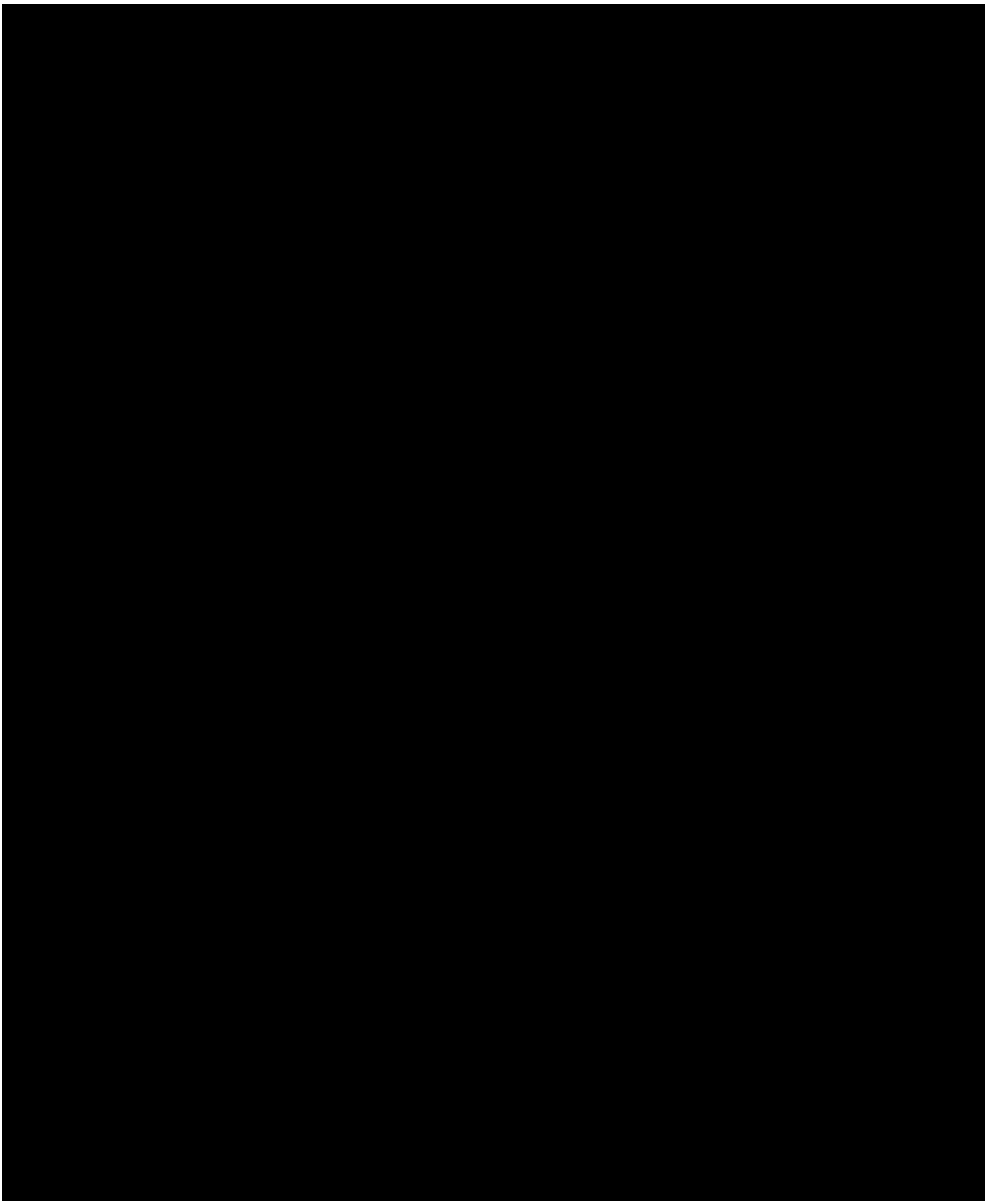
[redacted]

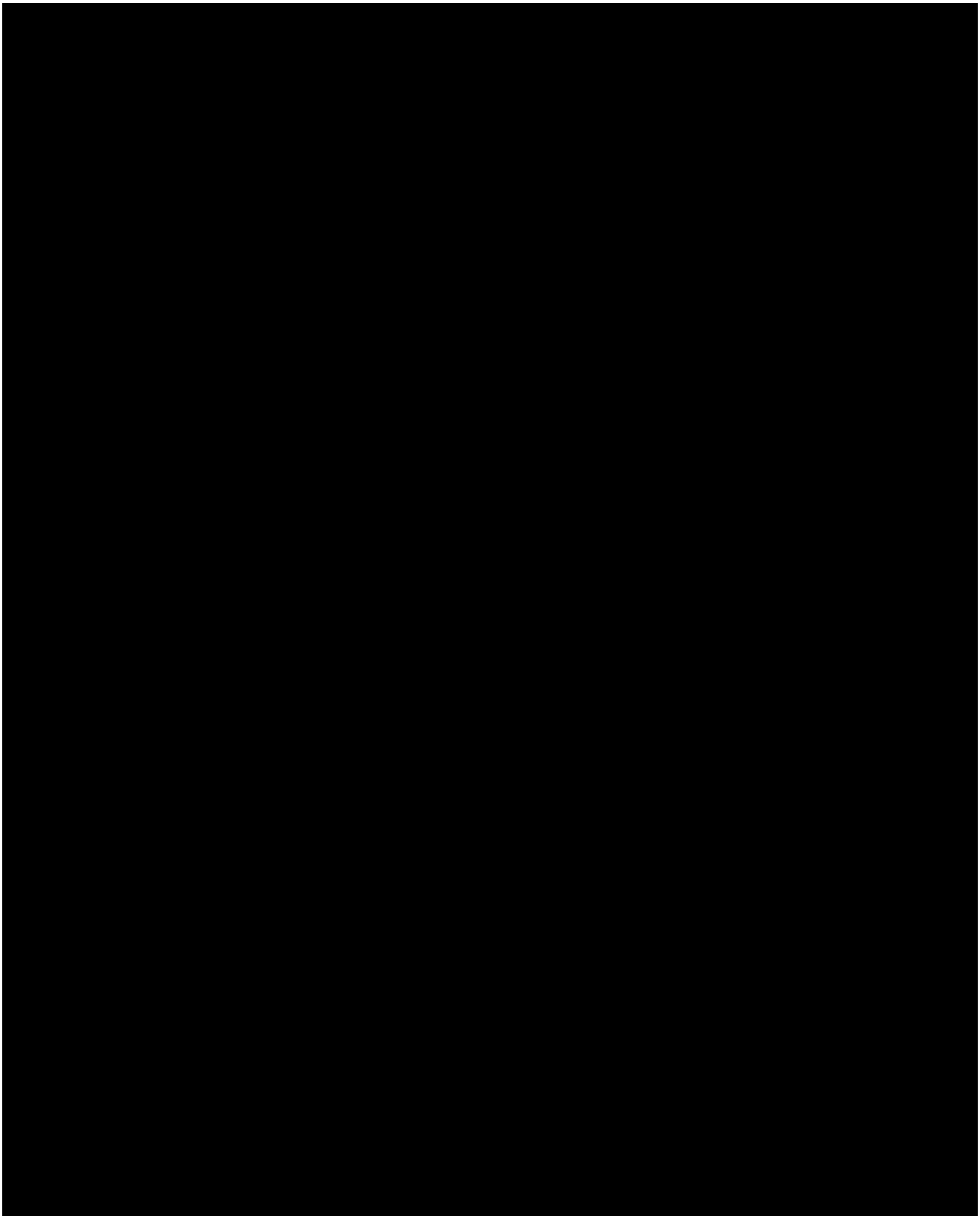
[redacted]

[redacted]

[redacted]

[redacted]





OTHER SOURCES

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Draft Privileged and Confidential - LFs-Financial Summary-Dec-Final (2019).xlsm.

Draft Privileged and Confidential - LFs-Financial Summary-Dec-Final (2020).xlsm.

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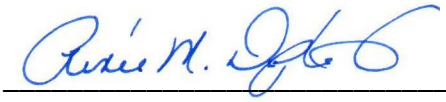
Appendix C: Acknowledgement of expert witness

I, Renée M. Duplantis, acknowledge that I will comply with the Competition Tribunal's code of conduct for expert witnesses which is described below:

1. An expert witness who provides a report for use as evidence has a duty to assist the Tribunal impartially on matters relevant to his or her area of expertise.
2. This duty overrides any duty to a party to the proceeding, including the person retaining the expert witness. An expert is to be independent and objective. An expert is not an advocate for a party.

March 25, 2022 

(Date) (Signature of expert witness)

Appendix D: Technical appendix of Tervita/ Newalta natural experiment

175. As I explain above, difference-in-differences (or DiD as defined above) consists of comparing the change in the outcome of interest (here, prices) observed for the treatment group to the change observed for the control group. In my "natural experiments" analysis, this involves comparing the post-merger price changes faced by those Tervita customers that experienced a change in market structure (i.e., the loss of Newalta as a potential supplier) as a result of the merger to price changes experienced by Tervita customers whose supplier options were unaffected by the merger (i.e., did not have Newalta as a supply option). I focus the analysis on the Tervita data because there is more variation in the Tervita data to allow me to account for the competitive constraints imposed on each other by Tervita and SECURE following the Tervita/Newalta merger. In particular, there are Tervita facilities that have SECURE facilities nearby and others that do not have SECURE nearby; however, there are not many SECURE facilities that do not have a Tervita facility nearby.

D.1 Simple averages illustration

176. Ultimately, I implement this analysis of the Tervita/Newalta merger retrospective using a regression methodology. However, I will first illustrate the difference-in-differences analysis using simple averages of prices for the treatment and control groups before and after the merger. While regression allows for a more precise estimation of the price effects, the simple averages approach is helpful for illustrating the logic and patterns in the data underlying the estimation.[193]

177. The data used for the DiD analysis consists of the Tervita transaction-level data, along with information on the travel distance for each customer to its potential supply options.[194] The transaction-level data are recorded at the level of a customer well location and include the

[193] Econometrically, using the simple averages is essentially equivalent to implementing the simplest version of the regression approach to difference-in-differences, i.e., running a regression of the price change faced by a customer on an indicator variable for whether or not the customer experienced a change in market structure as a result of the merger.

[194] Miller Transactions Data, replicated through 12_build_tervita_transaction_data_coordinates.R; Miller Report backup, "pairwise_distances_master_output.csv;" my backup, "Tervita Additional Pairwise Distances for NEA.csv."

information on the facility where the waste was disposed, and the substance-product combination, which is the detailed information on the waste-service provided.[195] The individual waste services were assigned to product markets using the same methodology that Dr. Miller employed for his analyses (detailed crosswalks are available in my backup materials).[196]

178. The data on travel distances are used to assign customer well locations to geographic markets, by applying the same customer-centric approach to market definition that Dr. Miller uses for his analysis.[197] Customer well sites are identified by UWIs (universal well identifiers) that can be converted to geo-coordinates. These can be used together with information on the location of facilities to calculate the driving distances between customers and all nearby facilities.[198] I supplement the driving distance data provided by Dr. Miller in his backup materials (covering customer well sites appearing in the transactions data for 2019 and 2020 and facilities that remain in existence as of the date of the SECURE/Tervita merger) with additional drive-distance data for well locations appearing in the transactions data for 2017 and 2018 (but not 2019 or 2020), as well as between customer well sites and facilities that existed during the period between 2017 and 2020 but have since closed.[199]

179. Analogous to Dr. Miller's construction of the data,[200] transactions were excluded from this analysis if the customer was "Tervita" (or "Newalta" after July 2018); if they had blank, add-on service, or terminalling service types; if they are associated with a TCC, Hydrovac, or fractionation plants; or indicated credits (i.e. negative revenues, or no volumes associated with

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[195] Tervita's transaction-level are recorded at the substance-service level.

[196] Miller Report, Section 4.1 and Section 7.7. See also Miller Report backup, "service_classification_secure_tervita.xlsx," which I have extended to also cover products sold by Tervita during the period 2017/2018 in the file "Tervita Product xWalk.xlsx" available in my backup materials.

[197] Miller Report, Section 4.2.

[198] As explained below, my analysis relies on the list of facilities provided in the Miller Report backup ("Masterlist.xlsx" and "first_party_data.csv"), but as compared to Dr. Miller (who considers facilities that remain in existence through 2021), I include in my analysis additional facilities listed therein that existed during the period 2017 and 2020 but have since closed. See my backup, "Facility History.xlsx" for further details.

[199] Miller Report backup, "pairwise_distances_master_output.csv;" my backup, "Tervita Additional Pairwise Distances for NEA.csv".

I use mapping software (specifically, the HERE Routing API) to query the truck-driving distance between each customer origin and nearby facility destinations. For more information on the HERE Routing API, see the documentation available at HERE Developer, "Introduction," https://developer.here.com/documentation/routing-api/dev_guide/index.html.

[200] *See*, e.g., notes to Miller Report Exhibits 4 and 6, as well as Miller Report Appendix Section 7.7.

a transaction). Moreover, the analysis does not include transactions with missing travel data due to unconvertable UWI or undefined travel routes (e.g. off-road terrain).

180. There are five main steps in the analysis I undertake to examine the prior Tervita/Newalta transaction:

a. Assess the market structure around each customer well location for each substance-product combination before and after the merger. (This step is identical to Dr. Miller's approach to customer-centric geographic markets).

b. Aggregate customer individual well locations up to the level of an individual customer at a given facility for each product purchased, and calculate the weighted average price and market structure (weighted by revenue) for each customer-facility-product combination. This aggregation allows me to assess prices for each type of waste delivered by a customer to each facility for disposal. For example, if a customer well location disposes of its waste at two different facilities, that customer would have two prices (one for each facility) factoring into the analysis.

c. For each type of waste delivered by a customer to a facility, those combinations that experienced change in market structure due to the merger of Tervita and Newalta form the "treatment" observations in the difference-in-differences framework. The "control" observations are the facility-substance-product combinations that saw no change in market structure.

d. Calculate the change in prices for each customer-facility -product combination between 2017/2018 and 2019/2020. 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.[201] So that the comparison of before and after price changes is undertaken over a consistent set of months and thereby not affected by the possibility of seasonality, the pre-period includes the time period August 2017 to March 2018.

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[201] Tervita announced the Bureau's investigation of the transaction had concluded on the one-year anniversary of the closing of the transaction. *See*, Tervita, "Tervita Corporation Announces End of Competition Bureau Review Period for the Newalta Transaction," July 22, 2019, https://tervita.com/news/article/tervita-corporation-announces-end-of-competition-bureau-review-p/.

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.

e. Compare the before-and-after change in prices among treatment observations to the change in prices among control observations to determine the overall effect. I define separate treatment and control groups for each pre-merger market structure; e.g., I compare the "3-to-2" treatment group to observations that remained in a 3-competitor market structure from 2017/2018 to 2019/2020. I also account for markets where SECURE was a remaining competitor after the Tervita/Newalta transaction.

181. Figure 22, Figure 23, and Figure 24, plot the facilities in Western Canada, which includes the Parties' facility locations, Newalta facility locations prior to the Tervita/Newalta merger, as well as competitor facility locations in Western Canada, including first-party facility locations operated by vertically integrated oil and gas producers. TRD/FST, LF, and WD facility locations are mapped separately in Figure 22, Figure 23, and Figure 24, respectively.[202] The figures include additional facility locations beyond presented in Dr. Miller's Exhibits[203] since it is necessary to include, for example, facilities that have closed during the Tervita/Newalta merger retrospective.[204]

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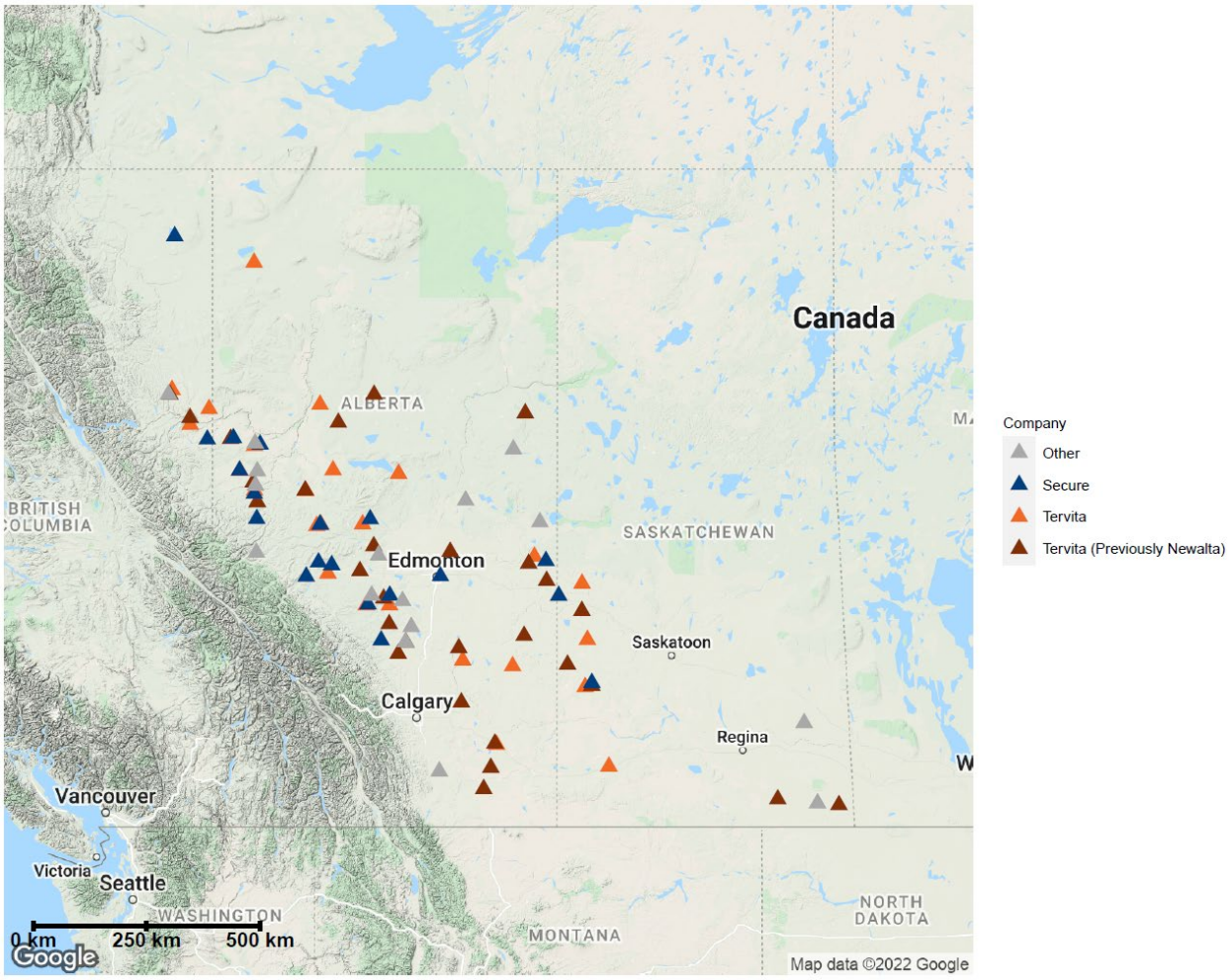
[202] Figure 22, Figure 23, and Figure 24, follow the mapping approach found in Exhibits 1-3 of the Miller Report including, for example, cavern facilities are mapped among TRD/FST, WD, and LF facilities, and mapped WD facilities also include waste water disposal facilities available at TRDs/FSTs, which also take in produced water and waste water. *See*, Miller Report, Exhibits 1-3.

[203] For example, Miller Report, Exhibits 1-3.

[204] For the purposes of my analysis, I rely on the list of facilities provided in the Miller Report backup ("Masterlist.xlsx" and "first_party_data.csv"); however, I include additional facilities to be able to conduct the Tervita/Newalta merger retrospective. For example, Figure 22, Figure 23, and Figure 24, include additional facilities which SECURE and Tervita have closed during the Tervita/Newalta merger retrospective period. Figure 23 excludes a previous Tervita LF facility located near Victoria (Highwest Landfill) and a LF facility that Tervita previously operated near Chilliwack (Bailey Contract Landfill) since these two facilities are outside the relevant area. In addition, Figure 24 also includes two additional Aqua Terra Water Management WD facilities (Alameda and Stoughton), as identified in Aqua Terra Water Management's Witness Statement. I also note that Dr. Miller's facility lists (and, therefore, the facility lists I largely adopt for the Tervita/Newalta merger retrospective) do not reflect more recent acquisitions, including, for example, Fleet Energy Ltd.'s acquisition of three Wolverine Energy and Infrastructure Inc. ("Wolverine") facilities, as well as Green Impact Partners Inc.'s acquisition of Wolverine's clean energy assets around May 2021. *See*, Witness Statement of Aqua Terra Water Management, Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, February 2022, ¶ 5; Brian Zinchuk, "Fleet Energy expands its operations, buying former Gibsons/Palko disposal sites," September 2019, https://www.sasktoday.ca/south/local-news/fleet-energy-expands-its-operations-buying-former-gibsonspalko-disposal-sites-4138056; Witness Statement of Green Impact Partners Inc., Commissioner of Competition v Secure Energy Services Inc., CT-2021-002, February 25, 2022, ¶ 5; and Wolverine Energy and Infrastructure Inc., "Notice of Special Meeting of the Shareholders of Wolverine Energy and Infrastructure Inc.," April 2021, pp. F-2-F-3 and H-1, https://wnrgi.com/wp-content/uploads/2021/04/Management-Information-Circluar-April-2021.pdf. *See also*, my backup, "Facility History.xlsx" for further details.

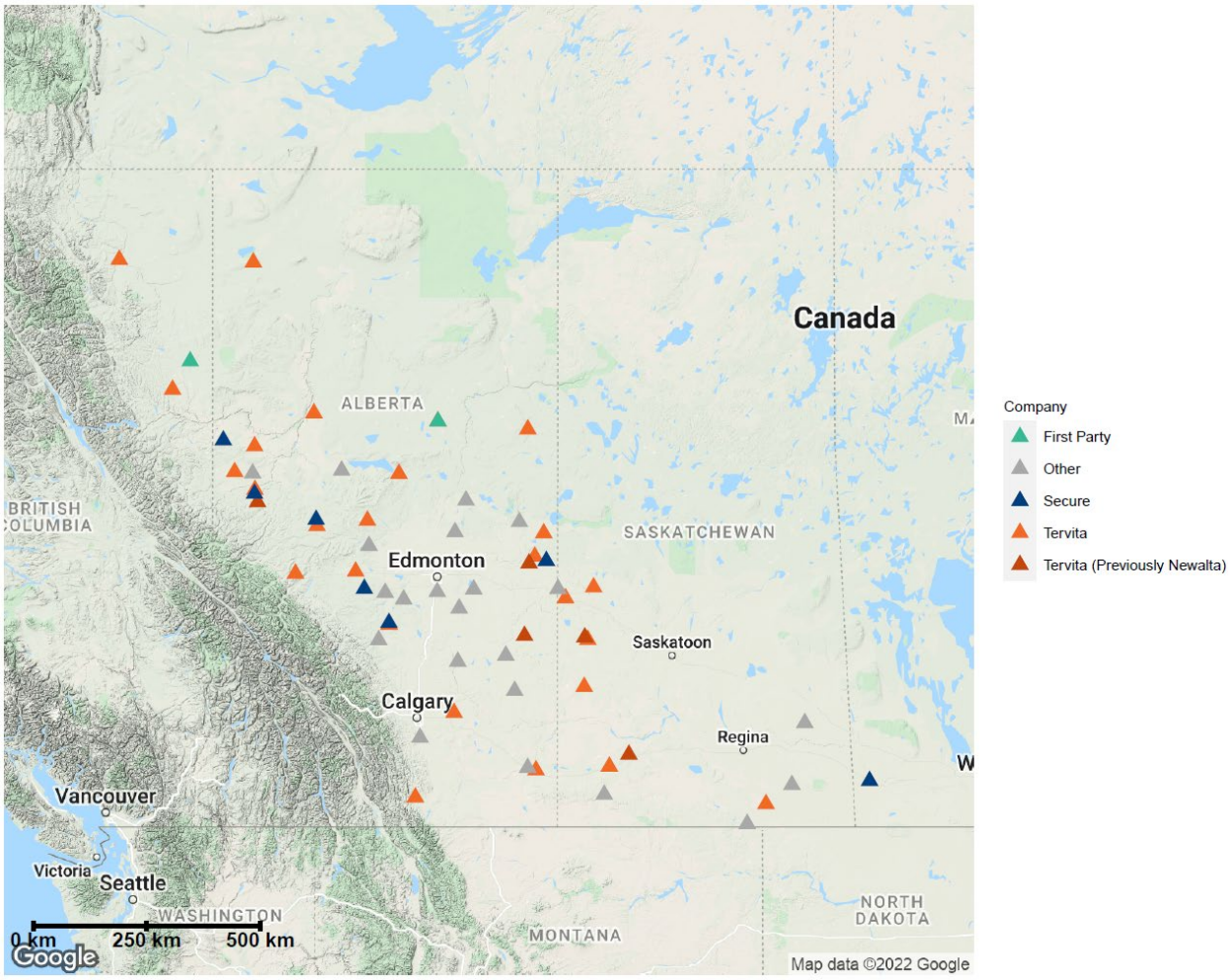
FIGURE 22: TERVITA/NEWALTA NATURAL EXPERIMENT – TRD/FST FACILITIES IN WESTERN CANADA



Sources:

See my backup, “Facility History.xlsx;” Miller Report backup, “Masterlist.xlsx” and “first_party_data.csv;” RBBA00004_000000338; “PROTECTED & CONFIDENTIAL Facility List - FINAL - 05282021 (1).xlsx;” “4 210422 - Revenues and Volumes.xlsx;” and Miller Transactions Data, replicated through 11_build_secure_transaction_data_coordinates.R and 12_build_tervita_transaction_data_coordinates.R.

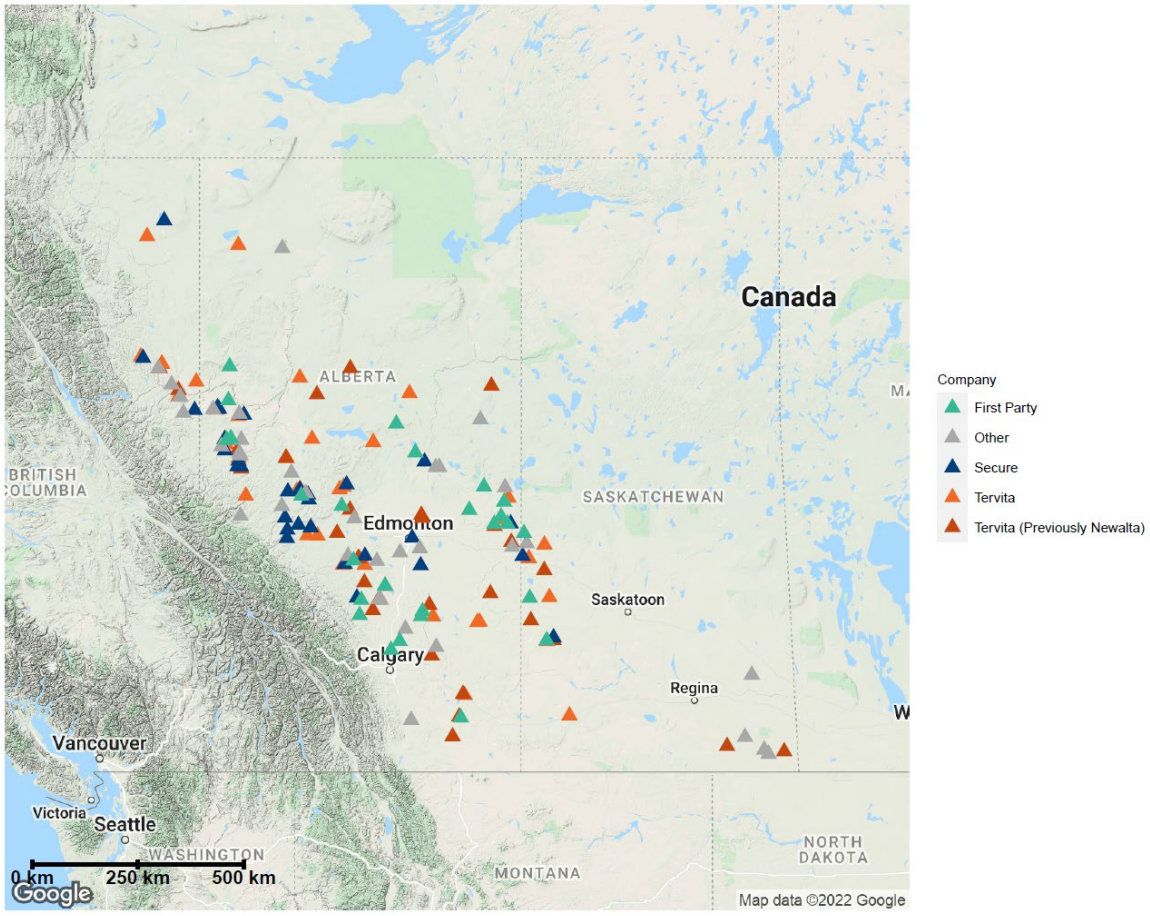
FIGURE 23: TERVITA/NEWALTA NATURAL EXPERIMENT – LF FACILITIES IN WESTERN CANADA



Sources:

See my backup, "Facility History.xlsx;" Miller Report backup, "Masterlist.xlsx" and "first_party_data.csv;" RBBA00004_000000338; "PROTECTED & CONFIDENTIAL Facility List - FINAL - 05282021 (1).xlsx;" "4 210422 - Revenues and Volumes.xlsx;" and Miller Transactions Data, replicated through 11_build_secure_transaction_data_coordinates.R and 12_build_tervita_transaction_data_coordinates.R.

FIGURE 24: TERVITA/NEWALTA NATURAL EXPERIMENT – WD LOCATIONS IN WESTERN CANADA



Sources:

See my backup, "Facility History.xlsx;" Miller Report backup, "Masterlist.xlsx" and "first_party_data.csv;" RBBA00004_000000338; "PROTECTED & CONFIDENTIAL Facility List - FINAL - 05282021 (1).xlsx;" "4 210422 - Revenues and Volumes.xlsx;" and Miller Transactions Data, replicated through 11_build_secure_transaction_data_coordinates.R and 12_build_tervita_transaction_data_coordinates.R.

182. The first step is to determine the market structure around each customer for the pre-merger and post-merger periods. For each customer well location, I follow Dr. Miller's methodology of using the 90th percentile travel distance from the customer location to the Tervita facility as the draw area from which to include competitors.[205]

183. The next step is to aggregate across a customer's individual well locations up to the level of the individual customer at a given facility for each product purchased and calculate the weighted

[205] Miller Report, Exhibit 4. 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.

average price and market structure for each customer-facility-product combination. Note that Tervita's transaction-level data are recorded at the substance-service level. Accordingly, for the subsequent calculation of prices, I consider two approaches to this aggregation. As a baseline, I aggregate across services to the level of the customer-facility-substance, as customers will ultimately face the "total bill" for the waste they deliver to a facility, reflecting all waste-disposal services applied by the facility. As an alternative, I aggregate transactions only across well locations, and calculate prices for each customer-facility-substance-service combination.

184. For each such customer-facility-substance (or customer-facility-substance-service) combination, I calculate the weighted average of the number of suppliers available to the customer in 2017/2018 as compared to 2019/2020. While this calculation is straightforward for most observations in the data, some customers can have multiple well locations serviced by the same facility and each well could have different supply options. 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 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. The absolute change in market structure is then the difference between the average number of competitors for that facility-substance combination in 2017/2018 and 2019/2020.

185. To make this calculation a bit more concrete, in Figure 25 below, I provide an illustrative example of this analysis. Consider customer X's waste-deliveries for disposal at facility Y for substance Z. Assume that the customer has four well locations, with the dollar value of waste disposal services purchased at Facility Y from each well recorded in column [A]. Column [C] shows the number of competitors available to that customer for each well based on the well-centric geographic-market definition methodology outlined by Dr. Miller implemented for the supplier options available in 2017/2018 prior to the Tervita/Newalta merger, and column [E] similarly shows the number of competitors available under the same methodology in 2019/2020 following the Tervita/Newalta merger. Using the purchases for each well location as the weights (column [B]), I calculate the weighted average of the number of competitors for that customer-facility– substance combination across the customer's wells in 2017/2018 as 2.7 (column [D] at the bottom) and in 2019/2020 as 2.1 (column [F] at the bottom).

FIGURE 25: ILLUSTRATIVE EXAMPLE – CUSTOMER X, FACILITY Y, SUBSTANCE Z

Customer X UWIs		Purchases from Facility Y [A]	Well Weights Based on Sales [B]=[A]/sum([A])	Number of Competitor Options 2017/2018 [C]	Weighted Average Number of Competitors 2017/2018 [D]=[B]*[C]	Number of Competitor Options 2019/2020 [E]	Weighted Average Number of Competitors 2017/2018 [F]=[B]*[E]
1	[1]	$1,000	0.1	2	0.2	1	0.1
2	[2]	$2,000	0.2	4	0.8	3	0.6
3	[3]	$3,000	0.3	3	0.9	2	0.6
4	[4]	$4,000	0.4	2	0.8	2	0.8
Total	**[5]**	**$10,000**	**1**		**2.7**		**2.1**

186. The resulting change in market structure faced by a customer between 2017/2018 and 2019/2020 identifies which customers were affected by the Tervita/Newalta merger, i.e., assigns them to "treatment" or "control" groups. Most customers will either have been affected by the merger (i.e., have a change in market structure of 1) or not have been affected (i.e., have a change in market structure of 0). However, as before, the calculation for customers with multiple well locations can result in a non-integral number if only some of those wells lost a supply option while others did not. Effectively, this non-integral number will represent the percentage of the customers for the facility that were affected by the Tervita/Newalta merger. Accordingly, I categorize the changes in market structure experienced by a customer as follows: relatively no change (i.e., the control group) if the change in market structure is less than 0.25; a relatively small change (i.e., the "low treatment" group) if the change in market structure is between 0.25 and 0.75; and a relatively large change (i.e., the "full treatment" group) if the change in market structure is greater than 0.75.

187. Returning to the example from Figure 25, the change in market structure faced by customer X at facility Y for substance Z is calculated as 2.7 (market structure in 2017/2018) minus 2.1 (market structure in 2019/2020). Since the difference is 0.6, this hypothetical customer-facility-substance-product would fall into the small change in competition category, and thus be considered a 3 to 2 market (since the number of competitors in 2017/2018 was rounded to 3 and in 2019/2020 was rounded to 2).

188. In this categorization, I also flag those observations where SECURE was one of the remaining competitors in 2019/2020 as opposed to observations where they were not one of the remaining competitors. Specifically, I define a customer's purchases of a substance (or

substance-product) to not have had SECURE as a supply alternative if SECURE was in the 90th percentile draw area for no more than 25% of the customer's well purchases.[206]

189. The third step is to calculate the change in price. For each customer-facility–substance-product combination found in the Tervita data, I calculate the average price change between the 2017 (pre-merger) and 2019 (post-merger) time periods.

190. Finally, I compare the before-and-after prices faced by the customer at a facility in 2017/2019 to those in 2019/2020 and calculate the average difference overall customers to determine the overall effect of the merger for customers based on changes in market structure. As noted above, customer-facility-substance (or customer-facility-substance-service) observations are categorized as into either the relatively no change control group, a relatively small change "low-treatment" group, or a relatively large change "full-treatment" group. The difference between the average price changes experienced by the full-treatment group and the no change control group is considered the upper bound of the effect of the merger, while the difference between the low-treatment group and the no change control group is considered the lower bound for the effect of the merger.

191. In Figure 26 below, I provide a visual illustration of the natural experiment analysis using simple averages, focusing the analysis to customers who pre-merger had two suppliers to choose from prior to the Tervita/Newalta merger. Each circle in the plot is the price change calculated between 2017/2018 and 2019/2020 for a given customer-facility-substance combination that had two competitors in their market in 2017, and the size of the circle represents the relative revenue for that customer. This illustrative example incorporates all natural experiments, but as discussed below, my regression analysis focuses on observations for which SECURE was not one of the remaining supply options ins 2019/2020.

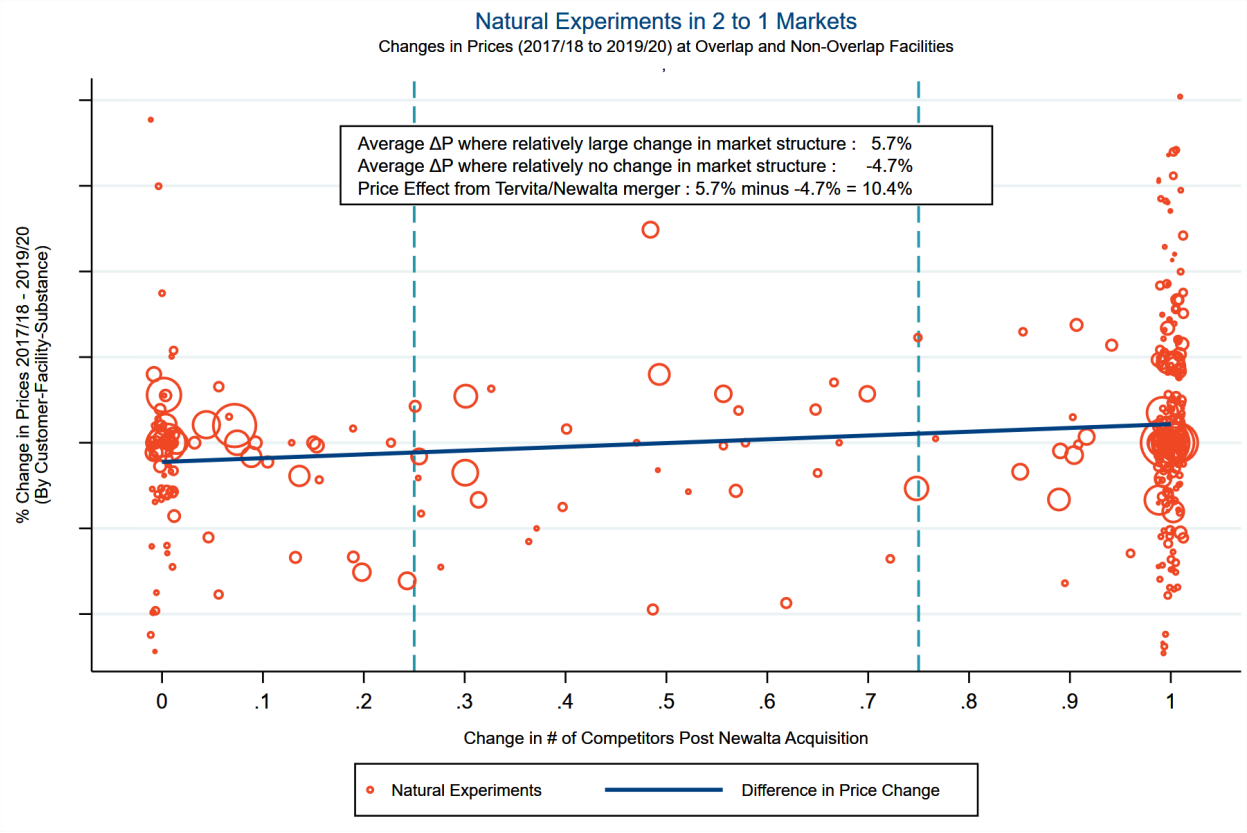
192. In Figure 26, the set of observations that experienced relatively no change in their available suppliers as a result of the Tervita/Newalta transaction (i.e., the control group) are represented by the circles to the left of the reference line at 0.25. These are instances where customers had two supply options both before and after the merger, i.e., "2-to-2s", the average before-and-after price change for which is -4.7%. On the other hand, the set of observations that experienced a relatively large change in their available suppliers (i.e., the full-treatment group) are represented by the circles to the left of the reference line at 0.75. These are instances

[206] Again, for most observations, SECURE will either have been a supply option or not (i.e., either 100% or 0% of their well purchases), but customers with multiple well locations can have non-integral numbers.

where customers had two supply options before the merger but only one option after, i.e., "2-to-1s", the average before-and-after price change for which being 5.7%.

193. The DiD analysis is conducted by comparing the price changes between these two groups, and subtracting the average price increase for those customers who did not experience a change in market structure from the average price increase for those customers who did experience a change in market structure. Accordingly, the average effect of the Transaction is 5.7% - (-4.7%) = 10.4%.

FIGURE 26: PLOT OF DIFFERENCE IN AVERAGE PRICE CHANGES



Sources: See material provided in my backup, "Newalta Analysis Backup."

D.2 Regression analysis

194. The simple averages analysis described above is a useful way to illustrate how the DiD model is implemented, but it does not provide us with comfort as to whether or not the results are statistically significant. Therefore, I perform the analysis using a standard difference-in-differences regression model framework. The regression framework also allows me to control for factors that did not change over time (such as the identity of facilities and products) using

"fixed effects," as well as account for observable factors whose changes over time could have also impacted prices (such as costs, which I have considered as a robustness check).

195. In Figure 27 below, I provide the price effects that the natural experiment shows occurred following the Tervita/Newalta merger using the regression methodology. Moreover, to account for the potential that the results would be affected by having SECURE as a remaining competitor to the merged Tervita/Newalta entity, I restrict attention to natural experiments where SECURE was not an alternative for most customers so as to provide a better comparison to the current Transaction. The baseline model is specified at the customer-facility- substance level, with the analysis also being undertaken at the customer-facility-substance service level as an alternative.[207]

196. As shown in Figure 27, prices increased on average as a result of the Tervita/Newalta transaction by up to 11% for customers who experience a change in the number of suppliers from "2-to-1", up to 9.8% for customers who experience a change in the number of suppliers from "3-to-2" and 0.9% for customers who experience a change in the number of suppliers from "4-to-3" or more competitors. As noted in the table, the results in the "3-to-2" categories and the "4-to-3" or more competitors categories are not statistically significant. This means that the model cannot determine with statistical precision whether or not the estimates are actually different from zero.[208]

[207] Formally, the baseline regression model in mathematical notation is as follows:

$$\ln P_{ijkt} = \beta_0 + \beta_1 \mathrm{T}_t + \beta_2 \mathrm{D}_{ijk}^{\mathrm{Low}} + \beta_3 \mathrm{D}_{ijk}^{\mathrm{Full}} + \delta_{\mathrm{Low}} \mathrm{T}_t \mathrm{D}_{ijk}^{\mathrm{Low}} + \delta_{\mathrm{Full}} \mathrm{T}_t \mathrm{D}_{ijk}^{\mathrm{Full}} + \mathrm{x}'_{ijkt}\gamma + \varepsilon_{ijkt}$$

where i indexes customers, j indexes Tervita facilities, k indexes substances, and t indexes time (either 2017/2018 or 2019/2020). Here, T_t is a indicator variable for the post-Tervita/Newalta merger period (i.e., 2019/2020), $\mathrm{D}_{ijk}^{\mathrm{Low}}$ and $\mathrm{D}_{ijk}^{\mathrm{Full}}$ are indicators for whether the customer was either in the relatively low-treatment or full-treatment groups, and x'_{ijkt} is a vector of other control variables that includes, for example, facility-fixed effects and substance-fixed effects. The parameters δ_{Low} and δ_{Full} on the interaction terms for the post-Tervita/Newalta merger period and the treatment group indicators provided the DiD estimates of the effect of the merger on prices. There is one such regression equation for each of the various possibilities for pre-merger market structures.

[208] Specifically, within a 95% confidence interval, I am unable to reject the null hypothesis that the coefficient on the merger effect is not statistically different from zero. Even though the estimates cannot be differentiated from zero, I continue to use the point estimates in my analyses to be conservative.

FIGURE 27: REGRESSION RESULT FROM NATURAL EXPERIMENT

# of Competitors Prior to Newalta Acquisition		Difference-in-Differences Price Effect [A]	No. Observations [B]	R^2 [C]
Across Customers, Facilities and Substance-Services				
Two Competitors	[1]	6.4%**	1,526	0.966
Three Competitors	[2]	2.2% to 5.7%	1,216	0.966
Four or More Competitors	[3]	1.3% to 2.1%	798	0.974
Across Customers, Facilities and Substances				
Two Competitors	[4]	3.1% to 11.0%*	646	0.912
Three Competitors	[5]	9.8%	586	0.940
Four or More Competitors	[6]	0.9%	444	0.946

Sources: See material provided in my backup, "Newalta Analysis Backup."

Notes: *, **, *** indicates statistical significance at 10%, 5% at 1% levels, with standard errors corrected for clustering at the facility level.

1. Market structure before Newalta acquisition is calculated for each customer, UWI and product (substance-service). These are then aggregated across UWIs to the customer-facility-substance-service level (or to customer-facility-substance level), weighting by sales.

2. Analysis excludes natural experiments with prices changes that exceed the 99th percentile or are less than the 1st percentile.

3. Regressions include Facility & Product fixed effects.

D.3 Robustness checks

197. For the DiD analysis, I conducted several robustness checks to confirm the results were not sensitive to changes in the specification. Irrespective of the differences in specifications, the results were consistent with those of the baseline model or the results were negative or consistently not different from zero. These robustness checks included:

a. Variations whereby I included all events versus only those where SECURE did not have a strong presence.

b. Different levels of aggregation for the market structure and variations on the weighting structure, including aggregating to the facility-substance level or facility-substance-service level.

c. Other definitions or the pre- and post-period, including all of 2019.

d. Additional control variables in the regressions, including facility-level costs.

e. Additional fixed effects to see their effect on the standard errors in the regressions.[209]

198. In total, after taking account of all of the robustness checks and holistically, the results were generally consistent with my conclusions from the analysis using my baseline model.

[209] Fixed effects will also impact parameter estimates in specifications that include cost controls.

Appendix E: Technical appendix of inputs used in Tervita/Newalta simulation model

199. To estimate the potential price effects from the Tervita/Newalta merger on an ex ante basis (i.e. as if it were 2018 and I was trying to predict the prices at the time of the review by the Bureau), I have used all of Dr. Miller's backup code for his model and simply adapted it to apply to the 2017 data that would have been available at the time of the Bureau's review of the Tervita/Newalta transaction. In this section, I describe any differences that may have been employed in the analysis as compared to Dr. Miller's analysis of the current Transaction.

200. The first difference between the analyses are the set of facilities included as competitor suppliers available to customers. When Dr. Miller implements his simulation model for the SECURE/Tervita Transaction, he incorporates facilities that remain in existence as of the date of the SECURE/Tervita merger. When I implement Dr. Miller's simulation model on the 2017 data, I must incorporate additional facilities that were open at the time of the Tervita/Newalta merger but may have subsequently closed. All of these facilities were previously included in Dr. Miller's facility list but not utilized during the course of his analysis.[210] In turn, for purposes of constructing customer-centric geographic markets I supplement the driving-distance data provided by Dr. Miller in his backup materials (covering customer well sites appearing in the parties' transactions data for 2019 and 2020 and the set of facilities considered by Dr. Miller for his report) with additional drive-distance data for well locations appearing in the parties' transactions data for 2017, as well as between customer well sites and facilities that existed during the period 2017 but have since closed.[211]

201. The next difference involves processing the parties' transactions data. For SECURE's and Tervita's data, I have used Dr. Miller's backup code for this purpose, adapting it to construct the inputs for the simulation model based on the 2017 data,[212] which in particular requires

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[210] Miller Report backup, "Masterlist.xlsx" and "first_party_data.csv." See my backup, "Facility History.xlsx" for further details.

[211] Miller Report backup, "pairwise_distances_master_output.csv;" my backup, "Additional Pairwise Distances for Simulations.csv."

My supplement includes drive-distance data for customer well locations appearing in the SECURE and Tervita transactions data, as well as those appearing in the Newalta transactions data. As mentioned above, I use mapping software (specifically, the HERE Routing API) to query the truck-driving distance between each customer origin and nearby facility destinations.

[212] Miller Transactions Data, replicated through 15_build_secure_transaction_data_distances.R and 16_build_tervita_transaction_data_distances.R.

extending Dr. Miller's categorization of waste disposal services into product markets to also cover services appearing in the 2017 data but not (e.g., due to changes in naming conventions) the 2019 and 2020 data used by Dr. Miller for his analysis.[213] In addition, I have also had to process the transactions data for Newalta, in a manner that is consistent with the methodology used by Dr. Miller for SECURE's and Tervita's data in this regard.[214] This too required assigning the waste disposal services offered by Newalta into product categories consistent with those from the SECURE and Tervita data, for which I was aided by the input of business people from SECURE.[215]

202. I also include facility margin data for Tervita and Newalta facilities for 2017.[216] In a handful of instances, the facility margins are either extremely high (greater than 100%) or extremely low (as well as some margins that are negative margins). The inputs for Dr. Miller's 2019 analysis also suffer from this issue as well.

203. Finally, while I use Dr. Miller's backup code for processing competitor volumes,[217] I face the issue that the data provided by a number of the third-party waste service competitors that provided data for use by Dr. Miller do not go back to 2017. In these instances, where a competitor provided data on their sales to the Bureau for other years, I use the maximum value from the available information for each facility in the simulations so as to be conservative. For those facilities where no 2017 information was available, I employ the same methodology that Dr. Miller uses to impute their market shares, and assume that those facilities have the same

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213 Miller Report backup, "service_classification_secure_tervita.xlsx." I have extended this to also cover products sold by SECURE and Tervita during the period 2017 in the files "Secure Product xWalk.xlsx" and "Tervita Product xWalk.xlsx," both of which are available in my backup materials.

214 "PROTECTED & CONFIDENTIAL Energy_Services_SAP_NAL_TRD_Landfill_Sales_2017_2018.txt;" "PROTECTED & CONFIDENTIAL Waste_Services_SAP_NAL_TRD_Landfill_Sales_2017_2018.txt." I take analogous data cleaning steps as Dr. Miller outlines in Section 7.7 of his report Appendix, including, for example, omitting internal-firm transactions (i.e., where Newalta itself appeared as the customer), as well as those that are indicated to be "non-oilfield" waste or add-on services, standardizing the units of measure for the waste volumes, and converting customer UWIs to geographic coordinates for those not already included in the data. In particular, the UWIs were geocoded using the Grid Atlas API. Grid Atlas, "API," https://www.gridatlas.com/docs/api.

215 "Newalta Products xWalk.xlsx," available in my backup; Engel Affidavit, ¶ 90.

216 I use data from Newalta and Tervita's P&L statements, PGMJ00014_00000007 and PGMJ00014_00000021, respectively. I follow Dr. Miller in adopting Mr. Harington's identification of variable costs for Tervita, and identify analogous line items to adapt the methodology to Newalta. My backup materials include the source files and code files used to perform these calculations.

217 Miller Transactions Data, replicated through 21_build_competitor_revenue_summary.R.

revenues as the maximum revenue of the relevant Tervita and Newalta facilities in the market.[218]

204. In Figure 28, I summarize separately for each product market the resulting Tervita/Newalta combined revenues, number of affected customers, and weighted-average market shares across all customer based markets that experienced a reduction in competition from the merger.

FIGURE 28: WEIGHTED AVERAGE OF TERVITA & NEWALTA MARKET SHARES FOR TRD, LANDFILL AND WATER DISPOSAL MARKETS

Change in Market Structure From Tervita/Newalta Merger		Number of Markets [A]
TRDs		
2-to-1	[1]	14
3-to-2	[2]	30
4-to-3 (or higher)	[3]	73
Total	[4]	**117**
Landfills		
2-to-1	[5]	-
3-to-2	[6]	3
4-to-3 (or higher)	[7]	4
Total	[8]	**7**
Water disposal (+TRDs)		
2-to-1	[9]	3
3-to-2	[10]	16
4-to-3 (or higher)	[11]	197
Total	[12]	**216**

[redacted]

Sources: See material provided in my backup, "Newalta Analysis Backup."

[218] Miller Report, ¶228.

Appendix F: Incremental transportation costs from facility closures

205. Counsel has asked me to calculate, using the same approach as Dr. Miller, the incremental transportation costs from facility closures. Like Dr. Miller, I consider only customers that currently use their nearest Party facility and that will use the next proximate remaining Party facility post-closure. I use the facility closures contemplated in SECURE's most recent integration plan for this analysis, as identified in the Harington Report.[219]

206. Aside from my use of the updated list of facility closures, I make two adjustments to Dr. Miller's analysis. First, I treat partial facility closures differently from full facility closures. Specifically, for facilities expected to only partially close, my calculation of incremental transportation costs only captures those transactions impacted by the stream of service expected to close. My calculation captures all transactions associated with facilities expected to fully close. Second, I drop 12 observations from SECURE's transactions data as prepared by Dr. Miller. These 12 transactions were made by customer West Lake Energy Corp at the Silverdale FST facility in 2019. I understand that historically this customer has accounted for a large proportion of the volume transacted at this facility and that, currently, the customer no longer holds an active contract with the Silverdale FST facility.[220]

207. My analysis is summarized in Figure 29 below.[221]

[219] Harington Report, Tables 4 and 5.

[220] Harington Report, Appendix F.

[221] Miller Transactions Data, replicated through 15_build_secure_transaction_data_distances.R.

FIGURE 29: INCREMENTAL TRANSPORTATION COSTS FROM FACILITY CLOSURES

Sources and notes:
Transportation costs are as presented by Dr. Miller, including a trucking charge of $155/hour, an average speed of 80.5 km/hour, and truck capacities for solids disposal, waste processing, treating, and water disposal. *See,* Miller Report, ¶¶ 225-226; RBBC00003_000000008; *and* Miller Report Backup, "exhibit_25.R."
I note that additional travel costs from distance and from drive time generally yield similar results. The Fox Creek LF SES discrepancy is driven by the fact that the next closest facility is further away than the closing facility in terms of drive time, but closer in terms of distance.
[A]-[C]: Full and partial facility closures based on Parties' updated integration plan. *See,* Harington Report, Tables 4 and 5.
[D]-[H]: I update Miller's Exhibit 25 code from his backup by accounting for the Parties' updated integration plan and for partial facility closures. Further, I drop 12 observations from SECURE's transactions data as prepared by Dr. Miller. These 12 transactions were made by customer West Lake Energy Corp at the Silverdale FST facility in 2019. I understand that historically this customer has accounted for a large proportion of the volume transacted at this facility and that, currently, the customer no longer holds an active contract with the Silverdale FST facility. *See,* Harington Report, Tables 4 and 5. *See also,* Miller Report Backup, "exhibit_25.R."
[D]: distance * truck capacity.
[E]: [D] / 80.5.
[F]: hours * truck capacity.
[G]: [E] * 155 * 2.

[H]: [E] * 155 * 2.
[13]: SUM([1]:[12]).
[30]: SUM([14]:[29]).
[31]: [13] + [30].

Appendix G: Results for alternative deadweight loss analyses

208. As I explained in Section V.C, I calculate deadweight loss using alternative inputs to my baseline for demand elasticity (again based on the Yatchew Report) and price effects (based on an alternative specification of my natural experiment analysis).

209. Figure 30 below shows deadweight loss based on the same baseline inputs reflected in the analysis in Figure 20, but using an overall demand elasticity of [redacted] (representing the conservative end of the overall range of [redacted] estimated by Professor Yatchew) rather than the individual service group elasticities.

FIGURE 30: DEADWEIGHT LOSS BY HYPOTHETICAL DIVESTITURE OPTION (BASED ON 2019) – ALTERNATIVE ELASTICITY

Remedy Option		Remedy Description [A]	Annual [B]	10-Year NPV [C]
Transaction		Full Transaction	$1,883,632	$13,135,174
Divestiture Option 1(a)	[1]	40 Tervita Facilities (Relevant Facilities)	$1,869,675	$13,037,844
Divestiture Option 1(b)	[2]	40 Tervita Facilities (Closest Facility)	$1,481,562	$10,331,406
Divestiture Option 2(a)	[3]	25 Tervita Facilities (Relevant Facilities)	$1,854,270	$12,930,420
Divestiture Option 2(b)	[4]	25 Tervita Facilities (Closest Facility)	$1,633,607	$11,391,668

Sources: Miller Report backup, "Exhibit 9.xlsx;" Elasticity of -0.25 for based on Yatchew Report; Predicted price effects based on Tervita/Newalta natural experiment.

Notes: See Figure 20.

210. Figure 31 below shows deadweight loss based on the same baseline inputs reflected in the analysis in Figure 20, but using price effects from an alternative specification of my natural experiment analysis shown in Appendix D, Figure 27 (which yields price effects of 6.4% for "2-to-1" markets, 5.7% for "3-to-2" markets, and 2.1% for "4-to-3 or more" markets).

FIGURE 31: DEADWEIGHT LOSS BY HYPOTHETICAL DIVESTITURE OPTION (BASED ON 2019) – ALTERNATIVE PRICE EFFECTS

Remedy Option		Remedy Description [A]	Annual [B]	10-Year NPV [C]
Transaction		Full Transaction	$1,932,366	$13,475,011
Divestiture Option 1(a)	[1]	40 Tervita Facilities (Relevant Facilities)	$1,916,814	$13,366,556
Divestiture Option 1(b)	[2]	40 Tervita Facilities (Closest Facility)	$1,484,740	$10,353,572
Divestiture Option 2(a)	[3]	25 Tervita Facilities (Relevant Facilities)	$1,862,792	$12,989,850
Divestiture Option 2(b)	[4]	25 Tervita Facilities (Closest Facility)	$1,206,857	$8,415,804

Sources: Miller Report backup, "Exhibit 9.xlsx;" Elasticities based on service group values from the Yatchew Report; Predicted price effects based on alternative specification of the Tervita/Newalta natural experiment.

Notes: See Figure 20.