



ENERGY REGULATION QUARTERLY

VOLUME 10, ISSUE 4 2022

MANAGING EDITORS

Mr. Rowland J. Harrison, K.C., LLB, LLM, Energy Consultant, Calgary

Mr. Gordon E. Kaiser, BA, MA, JD, Arbitrator, JAMS Toronto, Washington DC

SUPPORTERS

Justice David M. Brown, BA, JD, LLM,
Justice, Court of Appeal for Ontario

Mr. Scott Hempling, BA, JD, Adjunct
Professor, Georgetown University Law
Center, Administrative Law Judge, Federal
Energy Regulatory Commission

Dr. Mark A. Jamison, BSc, MSc, PhD,
Director, Public Utility Research Center,
University of Florida

Mr. William Lahey, BA, LLM, Professor,
Schulich School of Law, Dalhousie University

Mr. Peter Ostergaard, BA, MA, Former
Chair, BC Utilities Commission, Vancouver

Dr. André Plourde, BA, MA, PhD, Full
Professor, Faculty of Public Affairs, Carleton
University

Mr. Mark J. Rodger, BA, LLB, Senior
Partner, Borden Ladner Gervais LLP, Toronto

Mr. Lawrence E. Smith, K.C., BA, LLB,
MA, Partner, Bennett Jones, Calgary

Mr. C. Kemm Yates, K.C., BA, JD,
Arbitrator & Counsel, Western Arbitration
Chambers, Calgary

2022 CONTRIBUTORS

Ms. Bukola Agbede, LLB, LLM, Articling
student, Osler, Hoskin & Harcourt LLP,
Calgary

Mr. Kenneth A. Barry, former Chief Energy
Counsel, Reynolds Metals Co., Richmond,
VA, former Counsel, Energy Regulation,
Hunton Andrews Kurth, Washington, DC

Dr. Neil Campbell, HBA, JD, MBA, SJD,
Partner, McMillan LLP, Toronto

Mr. Brett Carlson, BA, JD, Associate,
Borden Ladner Gervais LLP, Calgary

Ms. Tori Chiu, BComm, JD, Articling
student, Blake, Cassels & Graydon LLP,
Calgary

Mr. Michael Cleland, BA, MPL, Senior
Fellow, Positive Energy, University of Ottawa

Ms. Taylor Farrell, BMSc, MSc, JD,
Associate, McMillan LLP, Ottawa

Dr. Monica Gattinger, BComm, MA, PhD,
Professor, Director, Institute for Science,
Society and Policy, Chair, Positive Energy,
University of Ottawa

Mr. John Gormley, BA, JD, Associate,
Osler, Hoskin & Harcourt LLP, Calgary

Mr. Matt Hammer, BA, JD, Associate,
Blake, Cassels & Graydon LLP, Calgary

Ms. Matti Lemmens, BA, LLB, Partner,
Borden Ladner Gervais LLP, Calgary

Mr. Roark Lewis, BA, JD, Associate, Borden
Ladner Gervais LLP, Vancouver

Mr. David Morton, BASc, P. Eng., Chair
and CEO, British Columbia Utilities
Commission

Mr. David J. Mullan, LLM, Emeritus
Professor, Faculty of Law, Queen's University

Ms. Paula Olexiuk, BComm, LLB, Partner,
Osler, Hoskin & Harcourt LLP, Calgary

Mr. Lars Olthofer, BASc, LLB, Partner,
Blake, Cassels & Graydon LLP, Calgary

Mr. Aidan Paul, BA, JD, Articling Student,
Borden Ladner Gervais LLP, Calgary

Mr. William Pellerin, BComm, JD, Partner,
McMillan LLP, Ottawa

Mr. Andrew Roman, retired litigation lawyer

Mr. Jacob Roth, BA, BSc, JD, Articling
student, Blake, Cassels & Graydon LLP,
Calgary

Ms. Chidinma B. Thompson, LLB, LLM,
PhD, FCI Arb, Partner, Borden Ladner
Gervais LLP, Calgary

Ms. Laura M. Wagner, BSc (Eng), JD,
Senior Associate, Borden Ladner Gervais
LLP, Toronto

Mr. Robert B. Warren, BA, BA, LLB,
former Partner, WeirFoulds LLP, Toronto

Mr. Daniel Watt, BA, LLB, Partner,
McInnes Cooper, Halifax

Ms. Lucia Westin, BA, BCL, LLB, Lawyer,
McInnes Cooper

Mr. Rick Williams, BA, LLB, Partner,
Borden Ladner Gervais LLP, Vancouver

Mr. Benedict S. Wray, LLB, MA, PhD,
LLM, Senior Associate, Borden Ladner
Gervais LLP, Ottawa

Mr. David V. Wright, BA, MA, JD, LLM,
Assistant Professor, University of Calgary

MISSION STATEMENT

The mission of Energy Regulation Quarterly (ERQ) is to provide a forum for debate and discussion on issues surrounding the regulated energy industries in Canada, including decisions of regulatory tribunals, related legislative and policy actions and initiatives and actions by regulated companies and stakeholders. The role of the ERQ is to provide analysis and context that go beyond day-to-day developments. It strives to be balanced in its treatment of issues.

Authors are drawn from a roster of individuals with diverse backgrounds who are acknowledged leaders in the field of energy regulation. Other authors are invited by the managing editors to submit contributions from time to time.

EDITORIAL POLICY

The ERQ is published online by the Canadian Gas Association (CGA) to create a better understanding of energy regulatory issues and trends in Canada.

The managing editors will work with CGA in the identification of themes and topics for each issue. They will author editorial opinions, select contributors, and edit contributions to ensure consistency of style and quality. The managing editors have exclusive responsibility for selecting items for publication.

The ERQ will maintain a “roster” of contributors and supporters who have been invited by the managing editors to lend their names and their contributions to the publication. Individuals on the roster may be invited by the managing editors to author articles on particular topics or they may propose contributions at their own initiative. Other individuals may also be invited by the managing editors to author articles on particular topics.

The substantive content of individual articles is the sole responsibility of the respective contributors. Where contributors have represented or otherwise been associated with parties to a case that is the subject of their contribution to ERQ, notification to that effect will be included in a footnote.

In addition to the regular quarterly publication of Issues of ERQ, comments or links to current developments may be posted to the website from time to time, particularly where timeliness is a consideration.

The ERQ invites readers to offer commentary on published articles and invites contributors to offer rebuttals where appropriate. Commentaries and rebuttals will be posted on the ERQ website (www.energyregulationquarterly.ca).

ENERGY REGULATION QUARTERLY

TABLE OF CONTENTS

EDITORIAL

Editorial	6
-----------------	---

Rowland Harrison K.C. and Gordon E. Kaiser

ARTICLE

Corporate Renewable Power Purchase Agreements: The Alberta Success Story	7
---	---

Paula Olexiuk, John Gormley, and Bukola Agbede

Bringing the Heat: New Directive Advances Alberta's Geothermal Development	13
---	----

Lars Olthafer, Matt Hammer, Jacob Roth, and Tori Chiu

WEBINAR

The Duty to Disclose Information to Energy Regulators in Canada and the United States	18
--	----

Energy Bar Association

BOOK REVIEW

<i>The Wolfberry Chronicle</i> Charts the Rise of a Small Texas Oil Company from Slim Pickings to the Jackpot.....	19
---	----

Kenneth A. Barry

EDITORIAL

Managing Editors

Rowland Harrison K.C. and Gordon E. Kaiser

Expansion of Alberta's energy industry beyond its hydrocarbon base continues apace. The authors of the lead article in this issue of *Energy Regulation Quarterly* report that "Alberta is the fastest growing jurisdiction for renewable power development in Canada." The Alberta Electric System Operator reports that 14 per cent of the province's power is now generated by renewables.

In "Corporate Renewable Power Purchase Agreements: The Alberta Success Story", the authors attribute Alberta's role as a "national leader in the renewable energy space" to several factors, including the unique deregulated wholesale market, government incentives and an abundance of electricity offtakers. Continued growth of renewable power development is expected with the recent enactment of the *Electricity Statutes (Modernizing Alberta's Electricity Grid) Amendment Act, 2022* (Bill 22) and pending related changes to the regulations.

Further diversification of Alberta's power generation mix may come from the recent introduction of a key element of the regulatory framework for the development of commercial electricity producing geothermal facilities in the province. Unlike some renewable energy sources, geothermal energy can be used for baseload and might therefore be expected to play an important role in the future power generation mix. In "Bringing the Heat: New Directive Advances Alberta's Geothermal Development", the authors review the release of Alberta Energy Regulator Directive 089: *Requirements for Geothermal Resource Development*. Regulatory uncertainties remain, however.

In Issue 2 of *ERQ* earlier this year, we announced that we were formalizing the practice of providing links to specific webinars relevant to our audience. This issue includes a link to a recent webinar on "The Duty to Disclose Information to Energy Regulators in Canada and the United States", sponsored by the Energy Bar Association, Canadian Chapter.

This issue of *ERQ* concludes with a review of Gregory Berkhouse's *The Wolfberry Chronicles and Other Permian Basin Tales from the Henry Oil Company*. This is more than the story of the rise to success of another intermediate E&P company and of its founder Jim Henry. Henry Oil played a central role in the modern development of the now ubiquitous fracking process - by building "a better mousetrap" — leading to the resurgence in recent decades in domestic U.S. oil production. ■

CORPORATE RENEWABLE POWER PURCHASE AGREEMENTS: THE ALBERTA SUCCESS STORY¹

*Paula Olexiuk, John Gormley, and Bukola Agbede**

Alberta is the fastest growing jurisdiction for renewable power development in Canada. Over the past decade, the province has emerged as a national leader in the renewable energy space because of: (i) the strength of its wind and solar resources, (ii) its unique deregulated wholesale electricity market, (iii) government incentives provided under the market-based *Technology Innovation and Emissions Reduction*² (TIER) regime and (iv) an abundance of electricity offtakers. The *Electricity Statutes (Modernizing Alberta's Electricity Grid) Amendment Act, 2022*³ (Bill 22) received royal assent in Alberta earlier this year and its innovative provisions are expected to support the continued growth of renewable power development in the province when it comes into force by the end of 2022 or early 2023, at the same time as the related changes to the regulations are brought into force.

Renewable developers, offtakers and other market participants need to be aware of the

following key developments in the Alberta renewable energy industry.

1) GROWTH IN DEMAND FOR POWER PURCHASE AGREEMENTS (PPAs) FROM PRIVATE OFFTAKERS

Market activity for private PPAs in Alberta has increased significantly in recent years, as a strategy used by numerous offtakers to meet their environmental, social and corporate governance (ESG) objectives. Alberta's PPA market continued to be active throughout the COVID-19 pandemic, despite reduced power demand and a depressed forward power price curve over this period.

While Alberta has an active PPA market, information is limited as private, bilateral PPA transactions are often not publicly disclosed. Table 1 in Appendix A below shows a select number of publicly announced private PPA transactions in Alberta in 2021, with offtakers

¹ This article is a revised version of Paula Olexiuk, Jesse Baker & Dana Saric, "Pursuing renewable projects in Alberta in 2021: 5 things you need to know" (8 December 2020), online: *Osler* <www.osler.com/en/resources/regulations/2020/pursuing-renewable-projects-in-alberta-in-2021-5-things-you-need-to-know>.

* Paula Olexiuk is a partner in Osler's Corporate department and Co-Chair of the firm's Construction and Infrastructure group. Paula's practice focuses on the construction, development, acquisition and divestiture of energy and infrastructure projects in Canada and abroad.

John Gormley is an associate in Osler's Regulatory, Environmental, Indigenous & Land group. His practice focuses on environmental, regulatory and Indigenous law issues that affect natural resource and energy development projects.

Bukola Agbede is an articling student in Osler's Calgary office. Prior to joining Osler, she interned at the corporate finance department of the British Columbia Securities Commission and practiced corporate law at a leading Nigerian law firm.

² Alta Reg 133/2019.

³ SA 2022, c 8.

from the telecommunications, energy and retail industries, including TELUS,⁴ Shell Energy,⁵ Pembina Pipeline Corporation,⁶ Cenovus Energy Inc.,⁷ TC Energy⁸ and Amazon.⁹

The key benefits to renewable project developers of entering into PPAs are revenue certainty and financeability. Without a PPA, a generator must sell electricity at the variable Alberta pool price and find a purchaser for environmental attributes, such as carbon emission offsets (which also vary in price). Not having a PPA can make it difficult to secure project financing to develop a renewable project in a variable market-price environment and in the absence of subsidies or other regulatory incentives. The strong and growing demand for renewable power in Alberta by corporate offtakers via PPAs is expected to drive growth in renewable power generation and translate into significant growth for the sector.

2) GOVERNMENT PROCUREMENTS: AN ASSET TO PROJECTS, BUT NOT NECESSARY

Government offtakers are particularly attractive for off-balance sheet-financed projects. Such projects allow developers to reliably source

project-level debt financing on the back of a long-term offtake contract with a creditworthy governmental counterparty.

In 2017 and 2018, the Alberta Renewable Electricity Program (REP) accelerated renewable project development in Alberta by awarding PPAs for 12 renewable wind projects (see Table 2 in Appendix A below), representing a total of 1,359 megawatts (MW) of incremental nameplate renewable generation capacity for the province. REP selected these projects from a pool of 59 projects for which bids were submitted (as reported by the Alberta Electric System Operator (AESO)).¹⁰ Four of these projects — Whitla Wind, Castle Rock Ridge Wind, Riverview and Windrise — are already in operation. The remaining projects are under development and many expect to begin operations later this year.¹¹

Alberta Infrastructure also ran a solar procurement in 2018 that resulted in the awarding of three 20-year contracts for 146,431 megawatt-hours (MWh) annually (see Table 3 in Appendix A below).¹² The Hays and Jenner solar projects were completed by their respective developers in 2021, and the Tilley project is scheduled for completion later this year.¹³

⁴ Capital Power, “Fact Sheet | Strathmore Solar” (last modified 20 July 2022), online (pdf): <www.capitalpower.com/wp-content/uploads/2020/12/Strathmore-Solar-Fact-sheet.pdf>.

⁵ BluEarth Renewable, “BluEarth Renewables Signs Long-Term Power Purchase Agreement with Shell Energy for Hand Hills Wind Project in Alberta” (8 April 2021) online: <blueearthrenewables.com/shell-ppa/>.

⁶ TransAlta, “TransAlta and Pembina Pipeline Announce 100 MW Renewable Power Purchase Agreement and Launch of the Garden Plain Wind Project” (3 May 2021), online: <transalta.com/newsroom/transalta-and-pembina-pipeline-announce-100-mw-renewable-power-purchase-agreement-and-launch-of-the-garden-plain-wind-project/>.

⁷ Cenovus, “Cenovus to buy renewable power from Cold Lake First Nations, Elemental Energy partnership” (22 July 2021), online: <www.cenovus.com/News-and-Stories/News-releases/2021/2267275>.

⁸ Perimeter Solar Inc., “Canada’s Largest Private Power Purchase Agreement Signed between Perimeter Solar and TC Energy” (30 September, 2019), online (pdf): <www.cansia.ca/uploads/7/2/5/1/72513707/perimeter_press_release_tc_energy_ci_agreement_09-27-19_rl_final.pdf>.

⁹ Government of Alberta, “Lathom Solar Project” (last visited 9 November 2022), online: <majorprojects.alberta.ca/details/Lathom-Solar-Project/4423>.

¹⁰ AESO, “REP results” (last visited 9 November 2022), online: <www.aeso.ca/market/renewable-electricity-program/rep-results/>.

¹¹ Capital Power, “Whitla Wind” (last visited 9 November 2022), online: <www.capitalpower.com/operations/whitla-wind/>; Enel Green Power, “Castle Rock Ridge Wind Farms” (last visited 9 November 2022), online: <www.enelgreenpower.com/our-projects/highlights/castle-rock-ridge-wind-farms>; Government of Alberta, “Windrise Wind Power Project” (last visited 9 November 2022), online: <majorprojects.alberta.ca/details/Windrise-Wind-Power-Project/4444>; “Buffalo Atlee Wind Farm 1/2/3/4” (last visited 9 November 2022), online: <buffaloatlee.com>; EDF Renewables, “Cypress (1&2) Wind” (last visited 9 November 2022), online: <www.edf-re.com/project/cypress-wind/>; Stirling Wind Project, “About the Stirling Wind Project” (last visited 9 November 2022), online: <stirlingwind.com>; “Jenner Wind Power Project” (last visited 9 November 2022), online: <jennerwind.com>.

¹² Government of Alberta, “Alberta-based solar power on the rise” (15 February 2019), online: <www.alberta.ca/release.cfm?xID=625497BB07A33-C042-927C-E60C5A0CF7F5D8D0>.

¹³ Government of Alberta, “Canadian Solar Solutions Solar Plants (Hays, Jenner, and Tilley)” (last visited 9 November 2022), online: <majorprojects.alberta.ca/details/Canadian-Solar-Solutions-Solar-Plants-Hays-Jenner-and-Tilley/3830>.

While the REP resulted in benchmark pricing and terms, which are otherwise generally lacking in the private PPA market, it was discontinued in 2019. Following its success, the Government of Canada followed suit and issued a request for information in April 2020 indicating its intention to procure one or more 20-year PPAs for 200,000 to 280,000 MWh of Alberta renewable power annually. On January 7, 2021, the federal government, through Public Services and Procurement Canada (PSPC), launched requests for proposals (RFPs) to purchase clean electricity in Alberta to power federal operations in the province.¹⁴ PSPC did not receive responses to these RFPs by the solicitation close in February 2021. As a result, it is seeking to move ahead with a retail-focused procurement strategy instead, also through an RFP process. In this new RFP process, PSPC is seeking prospective proponents to commit to the supply of approximately 255,000 MWh of clean electricity annually, commencing January 1, 2023.

Although government procurements have contributed to the growth of renewable generation in Alberta, the province's renewable energy sector is not dependent on such programs for continued growth. Rather, demand is expected to continue as: (i) renewable energy generation costs become increasingly competitive with other sources of electrical generation on the provincial grid and (ii) different types of investors look to add renewable energy assets to their portfolios to achieve their ESG objectives. For instance, in 2020, Copenhagen Infrastructure Partners invested in the Travers Solar project in southern Alberta, and in 2021, Amazon signed a PPA to purchase up to 400 MW of power from the project. This project will be Canada's largest solar project and one of Alberta's largest producers of environmental attributes under the TIER regime. The project's investors are prepared to develop the solar plant based solely

on merchant revenues and its developers expect it will be completed in 2022.¹⁵

3) REGULATORY UPDATES, UNCERTAINTIES AND RELATED FINANCIAL RISKS

Alberta's unique competitive market framework presents opportunities and challenges for developers. The commitment by the Alberta government to continue with an energy-only market and to support market-based solutions provides clarity to developers. Permitting self-supply with export ("self-supply") — which refers to a facility's ability to generate its own power for its own use and to sell excess power to the grid — also presents a meaningful opportunity for renewable power producers looking to partner with large consumers through on-site generation.

Self-supply has grown in popularity due to high grid-connection costs and reduced mid-scale generation costs. Previously, under the *Electric Utilities Act*¹⁶ and the *Hydro and Electric Energy Act*¹⁷, self-supply was prohibited in Alberta with the exception of municipally-owned generators, small renewable generators and co-generation power plants that have obtained an Industrial System Designation (ISD) approval from the Alberta Utilities Commission (AUC). Due to increased interest in self-supply and the broadly applicable prohibition under the legislation, the AUC submitted a discussion paper to the Department of Energy (DOE) on self-supply considerations in 2019. This paper and related engagement efforts resulted in the amendments reflected in Bill 22, which will allow for unlimited self-supply with export when the amendments come into force. On May 31, 2022, Bill 22 received royal assent and it is expected to come into force at the end of 2022 or early 2023 to coincide with accompanying amendments to the *Transmission Regulation*.¹⁸

¹⁴ Paula Olexiuk, Carson Wetter & Dana Saric, "Canada launches clean electricity procurement process with emphasis on Alberta solar" (18 January 2021), online: *Osler* <www.osler.com/en/resources/regulations/2021/canada-launches-clean-electricity-procurement-process-with-emphasis-on-alberta-solar>; Public Services and Procurement Canada, News release, "Requests for Proposal launched for purchase of clean electricity in Alberta" (7 January 2021), online: <www.canada.ca/en/public-services-procurement/news/2021/01/requests-for-proposal-launched-for-purchase-of-clean-electricity-in-alberta.html>.

¹⁵ The Canadian Press, "Amazon to purchase power from massive southern Alberta solar farm" *CBC* (24 June 2021), online: <www.cbc.ca/news/canada/calgary/alberta-amazon-solar-energy-power-vulcan-travers-1.6077152>; Government of Alberta, "Travers Solar Project" (last visited 9 November 2022), online: <majorprojects.alberta.ca/details/Travers-Solar-Project/3656>.

¹⁶ SA 2003, c E-5.1.

¹⁷ RSA 2000, c H-16.

¹⁸ Alta Reg 86/2007.

Despite regulatory clarity on permitting self-supply with export, there remains uncertainty with respect to applicable tariff rates, and certain key details of Alberta's regulatory framework which the regulators continue to review:

- **AESO tariff:** In 2020–2021, the AESO consulted on proposed changes to bulk and regional tariff design and submitted a formal application to the AUC in October 2021 for tariff changes. The application also proposes a Modernized Demand Opportunity Service intended to accommodate greater market participation by energy storage resources. The AESO's proposed changes are still under review by the AUC, with a decision expected later in 2022. The evolving tariff framework in Alberta has direct implications on the costs required to connect to Alberta's grid and, thus, remains a key source of financial risk for renewable project proponents.
- **Distribution system inquiry:** In 2020, the AUC inquired into how Alberta's distribution system should adapt to market change. The AUC initiated the inquiry in response to the rapid advancement in technology such as smart metering, battery storage and distributed energy resources. Following the inquiry, the AUC released a report in 2021 which addresses, among other issues, the need for a collaborative effort among the government of Alberta, AUC, AESO, electric distribution facility owners, consumers and alternative technology providers to build up a long-term plan that is consistent with Alberta's long-term strategic framework. The AUC also identified regulatory barriers surrounding the adoption of these new technologies and indicated the intention to take actions. The eventual outcomes of this initiative, which could drive regulatory, policy and legislative changes, could have material impacts on renewable projects, many of which seek to connect to the distribution system.

Regulators have acknowledged these key issues and are seeking to resolve them with stakeholder input, but certainty is not expected for months, if not years.

CONCLUSION

Alberta's renewable power market continues to provide considerable opportunities for both developers and offtakers. The expansion in private sector PPA activity, government procurement opportunities and the increased regulatory clarity provided through the legislative changes contained in Bill 22 stand as bellwethers for growth in 2022 and beyond. ■

APPENDIX A

Table 1: Select Publicly Available Private PPA Activity 2020-2021¹⁹

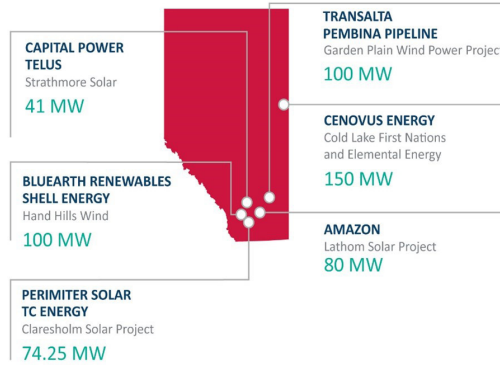
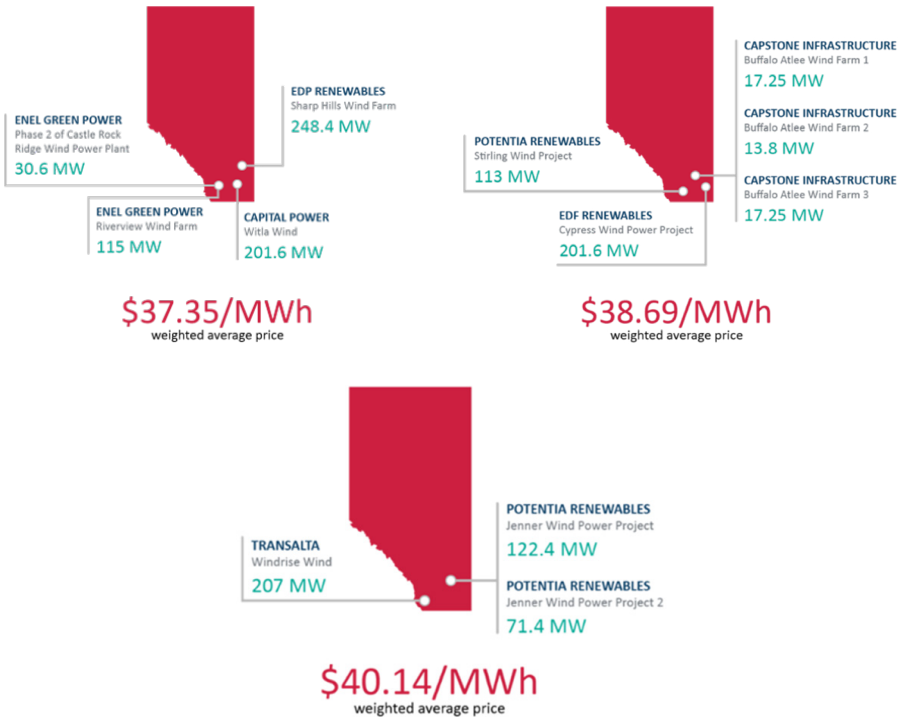
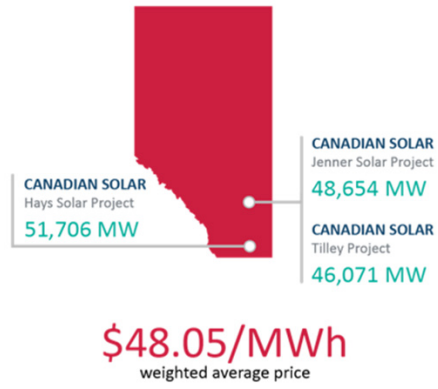


Table 2: REP Government of Alberta Procurement Results – Rounds 1, 2 and 3



¹⁹ Canada Energy Regulator, “Market Snapshot: Corporate power purchase agreements add renewables in Alberta” (last modified 21 June 2022) online: <www.cer-rec.gc.ca/en/data-analysis/energy-markets/market-snapshots/2022/market-snapshot-corporate-power-purchase-agreements-add-renewables-in-alberta.html>.

Table 3: Government of Alberta Solar Procurement



BRINGING THE HEAT: NEW DIRECTIVE ADVANCES ALBERTA'S GEOTHERMAL DEVELOPMENT¹

*Lars Olthafer, Matt Hammer, Jacob Roth, and Tori Chiu**

On August 15, 2022, a key missing element of the regulatory framework for the development of commercial electricity producing geothermal facilities in Alberta was addressed by the release of Alberta Energy Regulator (AER) Directive 089: *Requirements for Geothermal Resource Development* (Directive).² The Directive provides guidance on the requirements for applications for the construction and operation of geothermal facilities. This article outlines the overall scheme for geothermal development in Alberta now that applications can be made for geothermal facilities.

While the AER's press release on the Directive declares the geothermal regulatory scheme complete, uncertainties around issues such as royalties and public land dispositions remain.

BACKGROUND ON GEOTHERMAL POWER

The completion of the geothermal regulatory regime will allow for the advancement of new energy development opportunities that are in line with Canada's "net zero" objectives, which include a commitment to net-zero greenhouse gas (GHG) emissions by 2050 and a net-zero

¹ This article is a revised version of a Bulletin published by Blakes: www.blakes.com/insights/bulletins/2022/powering-up-new-directive-advances-alberta.

* Lars Olthafer advises and represents upstream oil and gas producers, pipeline and midstream companies, and electrical generation and transmission companies on regulatory and environmental compliance and facility approval processes, tolls and tariffs, public and aboriginal consultation, and land rights acquisition and compensation, in the context of both provincially and federally regulated projects. Lars regularly appears before energy and utilities boards and commissions in Alberta and B.C. (including the Canada Energy Regulator) as well as all levels of the Alberta and Federal Courts.

Matt Hammer's practice focuses on energy regulation, as well as environmental and Indigenous law issues. He acts for oil and gas producers, pipeline and midstream companies, mining companies, and electrical transmission, distribution and generation companies, including in the thermal, solar and wind sectors. He assists with obtaining regulatory approvals to develop major projects, regulatory proceedings necessary for commercial transactions, compliance proceedings, regulatory system design proceedings, and land rights acquisition and compensation proceedings.

Jacob Roth is an articling student. His practice focuses on energy regulation and environmental concerns as they relate to project infrastructure and transactions involving energy assets. He is actively involved in the energy transition and frequently represents renewable companies before the Alberta Utilities Commission. Jake has also worked with oil and gas producers, pipeline and midstream companies, and electrical transmission, distribution and generation companies. Jake has experience obtaining regulatory approvals and reviewing corporate regulatory compliance.

Tori Chiu is an articling student working in corporate, securities, and regulatory law. They have had articles published on topics including the law of constructive trusts in Canada, the treatment of self-help in the law, and theories regarding the role of rational investor models in modern securities regulation. Tori's experience includes representing publicly traded and private issuers on a broad range of matters and transactions, including mergers and acquisitions, continuous disclosure obligations, corporate reorganization, and general corporate and commercial matters.

² Alberta Energy Regulator, "Directive 089" (15 August 2022), online (pdf): <static.aer.ca/prd/documents/directives/Directive089_0.pdf>.

electricity grid by 2035.³ Meeting these goals will require the development and deployment of low- or no-GHG energy sources. While wind, solar and natural gas, with and without carbon capture, are projected to be the primary near-term contributors to these net-zero goals in Alberta,⁴ geothermal should not be overlooked.

Geothermal energy,⁵ unlike some other renewable energy sources, can be used for baseload power generation. Baseload power requires a consistent and reliable source of energy. Geothermal power plants can operate continuously at up to 98% capacity. Therefore, unlike intermittent and variable wind and solar energy, geothermal facilities harness the heat from the earth's core that is a constant source of energy. This constancy avoids the need for storage or redundant systems to account for the intermittent production of electricity using wind or solar.

While there are several types of geothermal facilities, the general process involves injecting water into deeply drilled wells and using the earth's core to heat the water and create steam.⁶ The steam powers a conventional turbine to produce electricity. Most commercial scale geothermal facilities include production and injection wells, a gathering and injection system, a power generation plant and an electricity transmission line.⁷ Since the wells used in geothermal energy production are drilled using technology similar to that used in Alberta's oil and gas industry, Alberta's extensive oil and gas expertise lends itself to geothermal energy development.⁸

REGULATORY FRAMEWORK FOR GEOTHERMAL IN ALBERTA

Geothermal facilities in Alberta are regulated under the *Geothermal Resources Development Act*⁹ (*GRDA*). The *GRDA* aligns with the framework for hydrocarbon development in Alberta, having similarities to the *Oil and Gas Conservation Act*. Pursuant to the *GRDA*, “geothermal resource” is defined as the natural heat from the earth that is below the base of groundwater protection. Hence, the *GRDA* regulates geothermal development below the base of groundwater protection, the approximate point where underground water turns from fresh water to salt water (see *GRDA*, section 1(1)(d); Water Wells and Ground Source Heat Exchange Systems Directive,¹⁰ section 1.2(2)(c)). Generally, the temperatures necessary to produce geothermal electricity can only be found below the base of groundwater protection. Therefore, the *GRDA* effectively applies to all commercial geothermal projects with the potential to generate electricity.

The *GRDA* sets out the regime for both the rights to geothermal resources and the approvals necessary for geothermal facilities.

Rights to Geothermal Resources and Surface Rights

The *GRDA* amended the *Mines and Minerals Act* (Alberta) to make clear that the mineral title owner has the right to explore for, develop, recover and manage the geothermal resources associated with those minerals (see *Mines and Minerals Act*,¹¹ section 10.2, as amended by *GRDA*, section 31). Geothermal project

³ Environment and Climate Change Canada, *2030 Emissions Reductions Plan*, Catalogue No En4-460/2022E-PDF (Gatineau: Environment and Climate Change Canada, 2022).

⁴ Canada Energy Regulator, “Canada’s Renewable Power – Alberta” (last modified 30 June 2022), online: <www.cer-rec.gc.ca/en/data-analysis/energy-commodities/electricity/report/canadas-renewable-power/provinces/renewable-power-canada-alberta.html>.

⁵ Clean Energy BC, “Geothermal” (last visited 23 November 2022), online: <cleanenergybc.org/sector/geothermal/>.

⁶ US Energy Information Administration, “Geothermal explained” (last modified 17 December 2021), online: <www.eia.gov/energyexplained/geothermal/geothermal-power-plants.php>.

⁷ Clean Energy BC, *supra* note 5.

⁸ Government of Alberta, “Geothermal Resource Development” (last visited 9 November 2022), online: <www.alberta.ca/geothermal-resource-development.aspx>.

⁹ SA 2020, c G-5.5.

¹⁰ Government of Alberta, “Water Wells and Ground Source Heat Exchange Systems Directive” (11 December 2018), online (pdf): <open.alberta.ca/dataset/5bc817ba-3d6d-45cd-a403-2e727abc665e/resource/508b38c0-0ca7-4fbc-8a90-cfeb5139e122/download/directivewaterwellsgroundsourceheatexchange-dec11-2018.pdf>.

¹¹ RSA 2000, c M-17.

proponents must, therefore, acquire mineral rights in order to harness geothermal energy.

In Alberta, most mineral title is vested in the Crown. The Government of Alberta has not disclosed whether it intends to charge a royalty on geothermal energy production, leaving a significant financial question unanswered for developers. Given the capital intensity of these projects, uncertainty around potential royalty regimes remains a significant cause of concern for industry players.

The Government of Alberta has released information on their administration of geothermal resource tenure through Mineral Rights Information Bulletin 2022-02.¹² For standalone geothermal wells, the applicant must have a geothermal resource tenure lease from the Government of Alberta or documented authorization obtained from the freehold mineral owner(s). If an applicant wants to conduct geothermal exploration or development activities under an existing mineral tenure lease, it must be done as co-production. Applicants are required to hold the subsurface rights to develop the geothermal resource before applying for a geothermal well licence.

The Government of Alberta has prescribed nine sections (nine square miles or 23.3 square kilometres) as the maximum geothermal lease size. The leasing system largely mimics that used for conventional oil and gas leases.

The term of a lease for geothermal exploration and development is dependent upon demonstrated progress in exploitation of the resource and is divided into three principal phases:

1. **Initial Term:** The initial term of the lease is five years. During this period, efforts must be undertaken to establish that a geothermal project is under active development. The project proponent

must show evidence of onsite physical work to demonstrate the geothermal resource and technical viability of producing geothermal energy to be granted an intermediate term lease.

2. **Intermediate Term:** The intermediate term of the lease is five years. By the end of the initial term, the project proponent is required to demonstrate that the geothermal lease is productive — in other words, it is generating energy derived from the leased geothermal resources.
3. **Continued Term:** This final term of the lease is indefinite, so long as Alberta Energy is satisfied that the geothermal lease is productive.¹³

From January 2022 until August 2022, there have been 72 applications for geothermal tenure.¹⁴ Of these applications, one lease was issued in April 2022 and 29 leases were issued from June to August 2022.

In terms of surface access, the *Surface Rights Act*¹⁵ does not apply to any type of power plant, including geothermal plants. The act also does not apply to the wells that would be required to harness the geothermal energy the power plant requires to function. Rather, applicants must acquire the necessary land rights from the owners of the lands where the geothermal development will be located by agreement.

If the application involves public lands, the applicant must apply for and be granted a public land disposition that may require the consent of any prior disposition holder of those lands (such as a grazing lease holder) in compliance with section 9(1)(e) of the *Public Lands Administration Regulation*.¹⁶ While there are currently no public land disposition types specifically applicable to geothermal facilities, the AER indicated in amendments to AER Manual 012: Energy Development

¹² Government of Alberta, "Administration of Geothermal Resource Tenure" (25 January 2022), online (pdf): <open.alberta.ca/dataset/cbf251cf-d1c5-420e-b104-f476c3dc6601/resource/678df070-fcb7-486e-a83c-2d63e2aed899/download/energy-mineral-rights-information-bulletin-2022-02.pdf>.

¹³ *Ibid.*

¹⁴ Government of Alberta, *supra* note 8.

¹⁵ RSA 2000, c S-24.

¹⁶ Alta Reg 187/2011.

Applications: Procedures and Schedules¹⁷ (Manual 012) made concurrently with the release of the Directive that it is willing to work with project proponents to accommodate geothermal activities within existing public land disposition types.

Approvals for Geothermal Facilities

The AER is the regulating body for geothermal development under the *GRDA* for the production of electricity, while Alberta Environment and Parks continues to regulate shallow geo-exchange projects solely for heat exchange (see *GRDA*, section 1(1)(g); Geothermal Resource Development). In order to develop a geothermal electricity project, project proponents must be granted a licence from the AER to drill or construct and operate a geothermal well or facility (*GRDA*, section 7).

Geothermal development has inherent synergies with conventional oil and gas development. In addition to capitalizing on Alberta's ample drilling expertise, the Directive sets out two methods for converting conventional oil and gas wells to geothermal wells. Where the geothermal applicant is the current licensee of the oil and gas well, the applicant may submit an amendment application for approval to the AER. Where the geothermal applicant is not the current licensee of the oil and gas well, the applicant must first apply for a transfer of the well licence and then submit a concurrent application for an amendment to the licence. Whenever a well licence conversion is approved by the AER, the applicant must meet the requirements of the Directive and Directive 020: *Well Abandonment*.¹⁸

Additionally, geothermal facilities that produce electricity require Alberta Utilities Commission (AUC) permitting and must undergo the Alberta Electric System Operator's (AESO) process for connecting to Alberta's interconnected electric system. Geothermal power plants may be exempt from the AUC application process if they are less than one megawatt in size. The AUC oversees the power

generation industry in Alberta and issues permits to construct and operate power plants. AUC Rule 007: *Applications for Power Plants, Substations, Transmission Lines, Industrial System Designations, Hydro Developments and Gas Utility Pipelines*¹⁹ applies to geothermal facilities listed thereunder as "other power plants."

AER Regulation

The geothermal facility licence application framework is provided by the *Geothermal Resource Development Rules*, released on June 21, 2022, the Directive and an updated section in Manual 012. This framework is largely based on and incorporates that for the development of oil and gas resources, with some notable elements as follows:

- Similar to oil and gas developments, applicants cannot start any site preparation, construction or operation before receiving AER approval. However, surveying the site is permitted (*GRDA*, section 7; Directive, section 2.2).
- Application requirements, including licence eligibility, participant involvement activities, and emergency preparedness are directly incorporated from the requirements for other kinds of resource development overseen by the AER (Directive, sections 2.4–2.6).
- Geothermal licence holders are subject to the AER's holistic liability assessment regime, including licensee management and liability assessment (Directive, sections 2.9–2.12). The AER will holistically assess a licensee's capability to meet its regulatory and reclamation liability obligations throughout the geothermal development lifecycle. The multifactor assessment considers, among other criteria, aspects such as financial health, estimated total licensee liability and licensing eligibility under AER Directive 067: *Eligibility Requirements for Acquiring and Holding Energy*

¹⁷ Alberta Energy Regulator, "Energy Development Applications" (August 2022), online (pdf): <static.aer.ca/prd/documents/manuals/Manual012.pdf>.

¹⁸ Alberta Energy Regulator, "Directive 20" (19 October 2022), online (pdf): <static.aer.ca/prd/documents/directives/Directive020.pdf>.

¹⁹ Alberta Utilities Commission, "Rule 007" (last visited 9 November 2022), online: <www.auc.ab.ca/rule-007/>.

Licences and Approvals.²⁰ The assessment ensures responsible management by the licensee of its collective liability for wells, facilities, pipelines and sites. For further information on the AER's licensee liability framework, see our May 2021 *Blakes Bulletin*.²¹

- Unlike other commercial scale renewable electricity infrastructure, geothermal facility operators, with approval from either the AER or AEP, may potentially obtain an overlapping use exemption from reclamation obligations. Such an avoids the requirement to obtain a reclamation certificate as otherwise required by the *Environmental Protection and Enhancement Act*,²² but only where another "specified land" activity, such as oil and gas development, is taking place. This exemption is usually not practically available for large-scale renewable facilities (producing more than a microgeneration facility or with a total footprint greater than one hectare). However, the exemption is potentially available for geothermal facilities (*Conservation and Reclamation Regulation*²³ 15.1(1)(vi)(B)) which are more readily collocated with active oil and gas facilities.

LOOKING AHEAD

Geothermal energy production is more capital intensive as compared to wind and solar energy. However, geothermal energy production boasts several promising attributes that sets it apart from other non-emitting and renewable resources. Beyond its reduced surface impact, which makes it desirable for co-development opportunities on leased lands, geothermal power production has two significant advantages: it can be used for baseload requirements and can be deployed when other

intermittent renewable sources are unavailable resulting in higher prices for power.

Some otherwise obvious geothermal development opportunities may also be limited because they target the same formations as carbon sequestration projects. The Government of Alberta's announcement on October 4, 2022 of the selection of 19 new proposals to develop carbon storage hubs illustrates the competing demand for subsurface rights in the pursuit of decarbonization objectives.²⁴

It remains to be seen whether Alberta's regulatory regime, largely based on the schemes for conventional oil and gas exploration and development, will enable new or established industry actors to seize the opportunity of geothermal energy production. In particular, the overlapping jurisdictions of the AUC and AER may cause some difficulties and the adaptation of the public lands disposition system to geothermal development remains a work in progress.

While these regulatory issues, the upfront cost of geothermal facility development and silence surrounding the royalty regime may cause geothermal investors to take pause, continuous and reliable renewable sources of energy are hard to find. Investors will certainly weigh these risks against the ability to recoup costs through strategic participation in Alberta's competitive electricity market. ■

²⁰ Alberta Energy Regulator, "Directive 067" (7 April 2021), online (pdf): <static.aer.ca/prd/documents/directives/Directive067.pdf>.

²¹ Kelly Bourassa et al, "Alberta Energy Regulator Introduces New Requirements for Acquiring and Holding Energy Licences and Approvals" (3 May 2021), online: *Blakes* <www.blakes.com/insights/bulletins/2021/alberta-energy-regulator-introduces-new-requiremen>.

²² RSA 2000, c E-12.

²³ Alta Reg 115/1993.

²⁴ Government of Alberta, "CCUS tenure management: Minister Savage" (4 October 2022), online: <www.alberta.ca/release.cfm?xID=8478571C7EF0A-E386-DC5E-B91F4FE6C7A8C1E9>.

THE DUTY TO DISCLOSE INFORMATION TO ENERGY REGULATORS IN CANADA AND THE UNITED STATES

Sponsor

Energy Bar Association, Canadian Chapter, October 28 2022

OVERVIEW

A recent decision of the Alberta Utilities Commission and a recent policy development at FERC reinforce an important principle of public utility law — regulated companies have a responsibility and a duty to disclose all relevant information to the regulator. In June of 2022 the AUC issued a decision approving a negotiated settlement reached between enforcement staff and ATCO Electric ordering ATCO to pay an administrative penalty of \$31 million as a result of breaching its duty to disclose relevant facts and other important information to the regulator. On July 28, 2022 FERC proposed a new rule that would significantly expand the existing “duty of candor” rule to apply to all FERC jurisdictional entities. The current rule was limited in its application to “sellers” of power at market based rates. The session explores the application and increasing importance of the duty to disclose and its implications for lawyer, regulators, utilities and market participants in North America.

MODERATOR

Gordon Kaiser

Arbitrator, Mediator and Counsel at Energy Law Chambers in Toronto.

Former Vice Chair, Ontario Energy Board, and former Market Surveillance Administrator, Province of Alberta.

THE PANEL

Justin Safayeni

Partner, Stockwoods ,Toronto.

Hon. Joseph T. Kelliher

Arbitrator, Mediator and Expert at FedArb in Washington DC.

Former Chair, Federal Energy, Regulatory Commission and former Executive Vice President, NextEra Energy.

Glenn Zacher

Partner, Stikeman Elliott, Toronto.

A recording of the webinar can be access here: <https://www.youtube.com/watch?v=K04TqlXtnpI> ■

THE WOLFBERRY CHRONICLE CHARTS THE RISE OF A SMALL TEXAS OIL COMPANY FROM SLIM PICKINGS TO THE JACKPOT¹

Kenneth A. Barry*

A business book tracing the history of a low-profile, Midland, Texas oil and gas company with nary a villain, scandal, or a larger-than-life wheeler-dealer at its center does not sound like the recipe for a spicy page-turner. However, *The Wolfberry Chronicles and Other Permian Basin Tales from the Henry Oil Company*² (hereafter, “*Wolfberry Chronicles*”), published in 2021 by company insider Gregory Berkhouse, is anything but dull. The book admirably succeeds on two fronts: first, it provides an engaging narrative of how Jim Henry — a hardworking, fundamentally decent, and only moderately risk-taking petroleum engineer — launched his own exploration and production (“E&P”) company at the dawn of the 1970s, building it from scratch into a dynamo worth over half a billion dollars; and, second, it educates the reader along the way on the geological underpinnings and evolution of shale drilling and fracking technology as they vaulted the U.S. into a global leadership position beginning in the early 2000s.

Berkhouse wisely employs a folksy, often droll style to make all that technical and financial information cohere and go down easily. Yet, he

strives not to “dumb down” the many business and engineering facets — and challenges — of developing an E&P company seeking its niche between the broad shoulders of the majors. As the author puts it in his introduction:³

Oil is a technical industry. I wanted to make this book interesting and understandable to readers who don't have a petroleum background, but without compromising the technical accuracy. One of my guiding principles...was: *accessible to the non-technical, inoffensive to the technical*. To that end, I have provided brief explanations of most of the technical terms and concepts. I have also devoted a few “pull-over” chapters to more fundamental technical terms and concepts.

A couple of pages later, Berkhouse self-identifies as “a geologist and an engineer” but “not a writer,” joking that “two out of three ain't bad.”⁴ He needn't apologize, however. The book not only mines the sweet spot between

¹ The following article is a reprint with permission of the one that appeared in the Energy Law Journal, Volume 43, No 2.

*Kenneth A. Barry is the former Chief Energy Counsel of Reynolds Metals Co. in Richmond, Va. and has served as Counsel in the energy regulatory section of Hunton Andrews Kurth's Washington, D.C. office. He has also been a regular contributor to two national energy law publications.

² Gregory Berkhouse, *The Wolfberry Chronicles and Other Permian Basin Tales from the Henry Oil Company* (Nimbus Brands Publishing, 2021).

³ Berkhouse, *supra* note 2 at iii.

⁴ *Ibid* at 1.

the overly technical and the simplistic; it also manages to be stylistically lucid and punchy, avoiding the turgidity one might expect from a flattering corporate biography written by a technology-steeped insider.

Another stylistic trick Berkhouse employs to good effect is to end most chapters with a short tease — a peek ahead at an intriguing turn in the story about to unfold. While it doesn't exactly convert the narrative into a whodunit, it averts getting too bogged down in a morass of drilling statistics and corporate personnel shuffling.

It amounts, all in all, to a heartening, surprisingly human tale. We tag along amiably with Jim Henry and his cohorts as they build a company from the ground up; and while there is no single dramatic arc tying the five decades of company history together, we are shuttled back and forth between failures and successes, big and small, as we root for the Henry team to make its mark. About midway through, several threads converge as we learn how Henry's geological and operations managers assemble an assortment of clues to locate, test, and ultimately hit a lucrative (but previously little-known) Permian Basin oil play known as the "Wolfcamp." The "Wolfberry" label featured in the book's title was concocted by the characters to link the better-known "Sprayberry" play — which gave Henry Oil its start — with its move into Wolfcamp geological strata to create a transformational double-play accessed via a single wellbore. In the Wolfberry chapters, Berkhouse credits a particular drilling supervisor who joined the Henry team halfway through its growth period with perfecting a new fracking methodology that worked like a charm in coaxing oil out of Wolfcamp geology (though he candidly explains that several other companies in the 1990s were independently reaching similar conclusions).

SETTING UP SHOP

The origin story of Henry Oil makes for an important baseline: Berkhouse wants his readers to fully appreciate how Jim Henry, who ended up an ultra-wealthy Midland oil baron and philanthropist, started out as just a middle-class

guy with a solid engineering education and enough gumption to incubate his own business after a handful of years working for bigger companies fresh out of college. (We learn over the course of the book that such individual entrepreneurship has been characteristic of the Texas oil and gas culture; little guys can spring up, carve out a space for themselves in the shadow of the industry giants they probably began with, and, with luck and pluck, grow their small businesses into big ones.)

In Chapter 1, titled "The Wonder Years," Berkhouse chronicles how Henry, early in his career as a petroleum engineer for a major company, realized that his own creativity and imagination were "stymied by stodgy management" and that, besides, he wasn't "very good at company politics."⁵ He switched jobs to work for smaller companies, but in 1969, just six months after he hooked up with a tiny firm, it folded. He took this setback as an opportunity to strike out on his own. Joining with an older geologist at the same firm — a more colorful personality who complemented Henry's serious side — the two set up a consulting firm, specializing in the Permian Basin's Sprayberry play.

Consulting, we learn, can be the first rung up the stepladder. In Texas, it is quite common for E&P companies to supplement their forces with consultants to tackle particular projects where they may be short staff or lack local expertise.⁶ Evaluating prospects and suggesting drilling locations can be the particular province of consulting geologists and engineers such as Henry and his partner became; and even the field operator mission may be delegated to a consulting firm.⁷ In any event, the nascent Henry consulting firm rapidly earned a solid reputation in the Midland area, leading to more requests for its services.

The duo began with virtually no capital — making consulting work basically their only option — yet didn't seek a deeper-pocketed partner to bankroll them; Jim Henry explained their independent streak this way: "We didn't want to get a money partner because we didn't want to share our success with anybody."⁸ For

⁵ *Ibid.*, at 7.

⁶ *Ibid.* at 11.

⁷ *Ibid.*

⁸ *Ibid.* at 13.

basics — office rent and overhead — they took out a small bank loan.⁹ The oil market in the waning days of 1969 bespeaks a long-ago era: the commodity sold for \$3.35/b; and even adjusted for inflation, that amounts to just \$22/b.¹⁰ When Henry's geologist partner was offered an onsite gig in New Mexico to advise on drilling a pair of wells for six weeks, he was paid just \$125 *per day*; and their consulting work went for ten bucks an hour.¹¹

More money came in the door when an area oilman offered the pair a finder's fee for each drilling prospect they generated, plus an overriding royalty on resulting lease production.¹² And that trickle became a stream when business acquaintances hired them for \$7000 to do a comprehensive study of prospects in the Sprayberry formation, a sprawling and increasingly active oil play in the Permian Basin.¹³ As a result of this work, Henry's budding firm earned a reputation as Sprayberry experts and were invited to spearhead more multi-well deals (the first of which unluckily fell through).¹⁴ By early 1971, Henry was hanging in there, surviving on consulting work when a bigger break with greater responsibility arose: it was asked to supervise a Sprayberry drilling program as "operator of record," rather than just consultants.

By late 1971, with an assortment of drilling projects under their wing, Henry and his partner were at last "making real money."¹⁵ Its oil field successes now resulted in deeper-pocketed outfits stepping in to buy working interests in their well drilling programs. Increasingly in the role of operators, the partners drilling more wells — 19 in 1972, 22 in the next year — and benefitted

from international tensions pushing up the price of oil.¹⁶ In these years, Henry Oil added staff, but in early 1977 the geology partner decided it was time to scale back on his working life. This was the first in a long litany of personnel departures and arrivals that *The Wolfberry Chronicle* dutifully records. The reader unfamiliar with the industry soon learns that such coming and goings, and the unique talents and drive individuals bring to the table, are a major determinant in how an aspiring oil and gas firm fares. In Berkhouse's telling, working side by side in a family business like Henry Oil also produces lasting friendships, and departures, however sad, were uniformly on good terms.

OIL AND GAS EXPLORATION 101

As previously noted, *The Wolfberry Chronicle* takes pains to teach the lay reader about the nuts and bolts of the oil and gas industry — both the business-running aspects and the technology. Berkhouse relishes describing incidents when Henry drilling projects ran into difficulties. These can be rather menacing, especially when the textbook solution for an unruly well doesn't fix the issue at hand, and supervisors have to improvise.¹⁷ Such undesired adventures, one imagines, make for spirited storytelling after-hours.

A key, though less dramatic, chapter is dubbed "Permian Basin Rocks for Jocks." A digression from the main storyline of the book, the chapter explains in geologic terms just what the Permian Basin is, how it came to be, and the ways in which this ancient seabed occupying what's now West Texas accumulated all that organic sediment¹⁸ that now yields oil. The section also reminds us that "rock-solid" is a

⁹ *Ibid.*

¹⁰ *Ibid* at 14.

¹¹ *Ibid.*

¹² *Ibid* at 15.

¹³ *Ibid* at 16–17.

¹⁴ *Ibid* at 18.

¹⁵ *Ibid* at 23.

¹⁶ *Ibid* at 29–30.

¹⁷ A not uncommon situation arising in the book is where a well nearing completion "kicks" — meaning the pressure of a just-tapped reservoir temporarily overcomes the control substances (such as "drilling mud") and devices used to regulate the flow of oil or gas released by the project. An extreme version is the classic "blowout." Equipment failures at this stage can also be an issue. Throughout the book, Berkhouse livens up the chronicling of routine well-drilling with tales of how the company dealt with problematic wells and the human factor that goes into these incidents.

¹⁸ The geology section also delves into the various types of sedimentation yielding different rock types. The nature of the sediment is crucial in pursuing oil-bearing formations (*i.e.*, those rich in "carbonates," composed of broken shells). Berkhouse, *supra* note 2 at 37–39.

relative term; sedimentary rock has variable degrees of both *permeability* and *porosity*.¹⁹ The tighter the formation, we learn, the more hydro-fracturing or “fracking” comes into play to release the embedded hydrocarbons.

Shale is labeled a “special case” of sedimentation by Berkhouse. It is formed when plankton (an omnibus term for “all manner of micro critters”) dies and joins the “underwater rain of inorganic silt and clay blanketing the sea floor,” turning together into rock, or “source rock” if it contains above a certain percentage of organic carbon.²⁰ The author then observes that this kind of rock becomes the “major source of the earth’s...oil and gas.”²¹

The geology chapter, inevitably laden with terms and concepts that may be unfamiliar to readers not steeped in geology, is relatively heavy going, but it’s leavened by Berkhouse’s characteristically jocular tone. It may require going back and re-reading, but it is helpful in following the exploration saga that unfolds, leading the Henry team to develop those prolific “Wolfberry” wells.

GETTING THE FRACKING RECIPE RIGHT

Another salient aspect of *The Wolfberry Chronicles* is its detailing how the Henry team — spearheaded in this case by Dennis Phelps, an operations engineer lured out of early retirement — built a better mousetrap when it came to the fracking process. Phelps, then working for ARCO, had been experimenting with alternative engineering approaches to fracking.²² His process insights, coupled with Henry Oil’s growing interest in probing the Wolfcamp geological zone, led to a resounding boom in the company’s oil production.

Preceding an in-depth account of this development, Berkhouse provides an enlightening capsule history of fracking. While

the term has only come into broad national awareness in the 2000s, the roots of fracking lie deep. The author relates that not long after the oil industry got going in 1859, drillers realized that most wells need a form of artificial stimulation. The medium for “shooting the well,” as the expression went, was first gunpowder and then nitroglycerin. The dangers of handling explosives were an accepted but very real risk.²³

Fracking took a leap forward towards *hydro-fracking* in the mid-1930s. By that time, acid had become a preferred medium for well stimulation. A chemist employed by Dow Chemical, Dr. Sylvia Stoesser (as it happens, the first woman chemist employed by Dow), discovered additives to the acid that would reduce corrosion to equipment (an undesirable side effect of acidizing) and, in the process, documented how pressurizing the fluid pumped into the well help trigger rock fractures at the target depth of the wellbore.²⁴ While Dr. Stoesser was experimenting with brine wells, not oil, she and her supervisor published their findings in *World Petroleum Magazine*, suggesting the implications of pressurized fluid injection for oil exploration.²⁵ The chapter goes on to narrate how hydrofracking became more and more common in the decades that followed, with various protocols recommended for the use of thickening additives (to increase the pressure impact) and sand as a fracture “proppant.”²⁶

What Dennis Phelps deduced, first for ARCO and then, coming out of retirement, for Henry was that *less* sand, *less* viscosity, but *wider* pipes and *more* water pressure (along with certain specifications for perforating the well in the target zone on completion) was both cheaper and potentially more effective. Dubbed “slickwater fracking” (referring to friction-reducing additives), Phelps’s fracking recipe was picked up by Henry and applied to the new Wolfcamp/Sprayberry (or “Wolfberry”) dual-target wells which Henry’s geologists were hot on the trail of.²⁷

¹⁹ *Ibid* at 42–45.

²⁰ *Ibid* at 40.

²¹ *Ibid*.

²² *Ibid* at 166–67.

²³ *Ibid* at 150–51.

²⁴ *Ibid* at 152–53.

²⁵ *Ibid*.

²⁶ *Ibid* at 154–55.

²⁷ *Ibid* at 172ff.

HENRY OIL HITS THE BIGTIME

As the company's early efforts around 2003 employing Phelps's fracking method confirmed his findings, Henry turned its attention to the Wolfberry project. The company's geologist studied the available data on other companies' past wells in the target areas — good, bad, or indifferent — and then prognosticated the extent of the formation.²⁸ As exploratory wells drilled by Henry himself proved promising, the firm leased more and more acreage, joining up with deeper-pocketed partners (eventually, Chevron as the acquirer of Unocal).²⁹ Henry remained the well operator, and took an increasing (if still minority) equity interest, as its confidence in the play (and finances) grew.

The drilling program, and the revenues of the company, snowballed in the mid-2000s. The steadily climbing market price of oil helped, too. At first, Henry tried to keep its objectives and results on the downlow to keep competition in the dark. Secrecy can only go so far but the company did manage to accumulate a huge amount of acreage and increase its market value exponentially by locating and more intensively drilling developmental wells (well drilled in proven areas).³⁰ Departures of key leadership team members — generally to start their own E&P firms — pockmarked these years of hard-earned success, but the holes were filled with new hires and internal promotions.

The financial bonanza made possible by Henry Oil's Wolfberry initiative leads to some surprising corporate upheavals, but that last part of the story should be left to the reader's discovery. The denouement of Henry's glory days occupies the final pages, including an extended period of doldrums accompanying its radical restructuring, downsizing, and management swings.³¹ The best war story in the book — the nearest thing to a page-turner — is saved for last, documenting Henry's first adventure in horizontal drilling

(which the company got around to only in late 2013). It was an epic "learning experience," as everything seemed to go haywire.³² But we apprehend how the integration of horizontal drilling techniques in the Permian in the 2000s, coupled with the "slickwater" fracking pioneered by Henry, turbocharged the productivity of the region's shale deposits.

CONCLUSION

Throughout *The Wolfberry Chronicles*, Berkhouse wants his audience to appreciate that the founder and his family insisted on sharing their good fortune with their employees, through generous bonuses and options to buy working interest shares in new drilling projects. Jim Henry's charitable donations to the community are likewise underscored. The biography of Henry Oil, the book stresses, is above all a tale of a decent man whose enterprising spirit, ability to attract like-minded managers with a "win-win" approach to business deals, and customarily conservative financial practices led to considerable success, despite the roller coaster of oil and gas prices and the inevitable encounters with failure on some projects.

This reviewer would have found helpful the inclusion of a few maps and diagrams accompanying certain chapters. Not all readers are as familiar with West Texas locations as the author. And while technical terms are usually well-explained, there are a few lapses into industry cant that could stand a bit of elaboration. However, these lapses are few enough; Berkhouse molds this welter of personalities, drilling projects, production data, and placenames stretching over 50 years into a comprehensible and informative whole. It should appeal to a wide audience of those interested in a deeper understanding of the evolution and transformative technical changes behind the growth in North America's oil and gas industry.³³ ■

²⁸ See *Ibid* at 182–95, Chapter 11, "Birth of the Wolfberry".

²⁹ *Ibid* at 214–15.

³⁰ *Ibid* at 231.

³¹ *Ibid* at 243ff, Chapter 16 ("Transitions").

³² *Ibid* at 267ff, Chapter 17 ("Henry Goes Sideways").

³³ The company's moral ethos has a strong religious undercurrent that surfaces on several occasions. It is encapsulated in Jim Henry's quoted remark in the final chapter: "What I'd like is for the basic principle of our company to continue. I want this to be Christian company...It is what drives us, what is at the heart of our company." *Ibid* at 281. This may discomfort readers of other denominations, and gave this reviewer pause. But it's plainly who Jim Henry is, and the book is in no small part his biography. We also learn in that chapter that, as an engineer, Henry rates the potential of nuclear as a "clean energy" option above solar and wind. *Ibid* at 280–81.