OWNERSHIP ISSUES IN THE PRODUCTION OF GEOTHERMAL ENERGY

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A. INTRODUCTION

In normal times the potential of geothermal energy is visible to tourists around the world. Visitors to the Old Faithful geyser in Yellowstone National Park, the geothermal parks in the vicinity of Rotorua in New Zealand, or Geysir Hot Spring in Iceland watch with awe as geysers and fumaroles erupt with impressive displays of hot water and steam on a regular basis. However, these phenomena are just the tip of the furnace. They provide a visible manifestation of the molten core of the earth, which, at a depth of about 6500 km, is at a temperature of approximately 6000 degrees C, as hot as the surface of the sun.[1] While it is impossible to gain access to this heat, geothermal energy can be produced from much shallower depths.

Some areas in the Western Canada Sedimentary Basin, which has been the dominant source of Canada's oil and natural gas, contain promising prospects for the commercial production of geothermal energy. The sub-surface temperature increases by roughly 20-50 degrees C for every kilometre of depth.[2] This geothermal gradient can result in temperatures between 100 and 150 degrees C at depths between 3 and 3.5 km, where there is a possibility of commercial production. The state of existing technology makes the cost of drilling prohibitive at depths significantly below 3.5 km. This proposition is supported by the experience of the DEEP Project, which will be discussed in Section C of this article. DEEP drilled the deepest well in Saskatchewan to a depth of 3.53 km at a cost of $3.72 million and encountered temperatures of 125 degrees C.[3]

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[1] David Roberts, "Geothermal Energy is Poised for a Big Breakout" (21 October 2020), online: *Vox* <www.vox.com/energy-and-environment/2020/10/21/21515461/renewable-energy-geothermal-egs-ags-supercritical> at "What is Geothermal Energy?"
[2] Cedar Hanneson, "Hot Rocks and Radio Waves: Exploring Canada's Geothermal Potential" (presentation delivered at the Edmonton Public Library Energy Talks, 26 May 2021) [unpublished].
[3] "Deep Earth Energy Production Geothermal Power Project" (presentation delivered at the annual meeting of the shareholders, 24 November 2020) at 19, online <deepcorp.ca/wp-content/uploads/2020/11/2020-11-24-DEEP-AGM-Presentation-for-website.pdf>.

The DEEP Project illustrates the potential of geothermal energy. Once the necessary wells have been drilled, they can enable the long-term production of energy without significant emissions of greenhouse gases. As the supply of both wind and solar power are interrupted when the wind does not blow or the sun does not shine, geothermal energy provides the attractive possibility of maintaining a reliable baseload supply to an electrical grid based on renewable resources.[4]

Geothermal energy projects are underway in all three western provinces and show interesting potential. If this nascent industry is to flourish, it requires a firm legal foundation consisting of at least two elements. Firstly, the legislation must establish clear ownership rights to the necessary resources, and second, the rights regime must not impose costs that will deter the commercial development of an industry which, at the present time, is highly marginal. The purpose of this article is to examine whether Alberta's *Geothermal Resource Development Act* (*GRDA*), which was proclaimed in December 2021,[5] meets these criteria.

In order to assess the *GRDA*, it is first necessary to understand the broad outlines of how geothermal resources are produced. There are two feasible methods that currently have the potential to produce energy at prices that could be commercial in the foreseeable future. For the sake of simplicity, and at the expense of scientific precision, they will be described as the hot water and the hot rocks methods.[6]

The oldest method of capturing geothermal heat involved the interception of warm water in the vicinity of geysers and hot springs for domestic purposes.[7] In the late nineteenth century, it became possible to extract sufficient heat to supply an entire urban district from shallow underground reservoirs in the immediate vicinity. The Geysers power plant complex in California, first commissioned in 1960, provides the largest scale example of this method of production.[8] It draws on geothermal wells in a field of 30 square miles to produce an average of 955 MW of power.[9]

The use of hot water to produce electricity can occur only at a limited number of places in the world with favourable geological conditions.[10] In most of western Canada, with some notable

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[4] See "About Deep" online: *Deep* <deepcorp.ca/about-deep/>.
[5] *Geothermal Resource Development Act*, SA 2020, c G-5.5 [*GRDA*], proclaimed in force on December 8, 2021.
[6] Roberts, *supra* note 1.
[7] *Ibid.*
[8] *Ibid.*
[9] Wikipedia, "The Geysers" (23 April 2021), online: *Wikipedia* <en.wikipedia.org/wiki/The_Geysers#:~:text=Geothermal%20power%20stations%20%20%20%20Name%20,%20June%201979%20%2028%20more%20rows%20>.
[10] Roberts, *supra* note 1 at no 2.

exceptions in British Columbia, geothermal energy is likely to be produced by conduction from hot rocks through enhanced geothermal systems (EGS).[11] This method involves injecting water into hot rocks deep below the surface of the earth. It requires fracturing the rocks to allow the water to pass through the rock formation.[12] The heated water is then returned to the surface through a production well. A variant, known as an advanced geothermal system (AGS), relies on a closed loop system.[13] An AGS system involves the injection of a transmission fluid through sealed boreholes and pipes that extend through the underground formations of hot rocks.[14] The heated fluids are returned to the surface through recovery wells. Unlike EGS, an AGS system neither introduces substances into the earth nor extracts substances from the earth.[15]

This thumbnail sketch of the production of geothermal resources will provide the background to the discussion of the nature and effects of ownership rights in Sections B and C of this article.

B. APPROACHES TO THE OWNERSHIP OF GEOTHERMAL RIGHTS

A superficial reading of the *GRDA* might suggest that there can be no controversy about who owns and has the right to develop geothermal resources. The *GRDA* adds a new section to the *Mines and Minerals Act* that contains this confident assertion:

> The owner of the mineral title in any land in Alberta has the right to explore for, develop, recover and manage the geothermal resources associated with those minerals and with any subsurface reservoirs under the land.[16]

The *GRDA* defines the "geothermal resource" as "the natural heat from the earth that is below the base of groundwater protection."[17]

The purpose of the amendments is clear. In the large area of Alberta where the Crown owns the surface of the land and the underlying mines and minerals, the amendments indisputably establish that the Crown owns and has the unrestricted right to develop geothermal resources. However, where individuals own the land overlying Crown mines and minerals and where one person owns the title to the surface and another owns some or all of the underlying mines and minerals, the effect of the *GRDA* is much less clear. In cases where the title to the land and mines and minerals is split, the impact of the *GRDA* is legally controversial. The nature of this

[11] *Ibid.*
[12] *Ibid.*
[13] *Ibid* at no 4.
[14] *Ibid.*
[15] *Ibid.*
[16] *GRDA*, s 31(6), adding a new s 10.2 to the *Mines and Minerals Act,* RSA 2000, c M-17.
[17] *GRDA*, s 31(2)(iii)(i.1), adding to s 1(1)(d) of the *Mines and Minerals Act, supra* note 16.

controversy can be analysed in three stages. First, we must ask who owned geothermal resources before the proclamation of the *GRDA*. Secondly, we must investigate whether the *GRDA* extinguishes the rights of those who have a credible claim to the ownership of geothermal resources at common law. Thirdly, we must address the question of the ownership of geothermal resources where different individuals own particular minerals in the same land. Each of these questions will be addressed in turn.

1. The Ownership of Geothermal Resources at Common Law

If the *GRDA* had never been passed, who might have had a legitimate claim to the ownership of geothermal resources? The answer to this question involves some basic principles of the law of real property.

If A owns a parcel of land in fee simple and without any qualifications, the classical description suggests that A's rights extend up to the heavens and down to the depths of the earth, in accordance with the Latin maxim, *cuius est solum eius est usque ad coelum et ad inferos.*[18] The advent of air travel placed an upper limit on this principle when the courts recognized that A could not prevent aircraft from using the airspace above a parcel of land.[19] However, the courts of the common law world have not imposed a similar limitation on the maximum depth of A's right to the subsurface of land.[20]

The most vivid example of the extent of the ownership of large underground spaces by the surface owner is provided by a celebrated decision involving the Great Onyx Cave in Kentucky. L.P. Edwards had opened the cave as a tourist attraction that was accessible only from the mouth of the cave located on his land.[21] Edwards' neighbour, Lee, established that approximately 30% of the cave was located beneath his land, though there was no means of access except through Edwards' property. The Kentucky Court of Appeals applied the *cuius est*

[18] Bruce Ziff, *Principles of Property*, 7th ed (Toronto: Thomson Reuters, 2018) at 110 [Ziff, *Principles of Property*]. See also Sir William Blackstone & Robert Malcolm Kerr, *The Student's Blackstone: Commentaries on the Laws of England: In Four Books: Abridged and Adapted to the Present State of the Law by Robert Malcolm Kerr,* (London: John Murray, 1873) at 126.

[19] *United States v Causby*, 328 US 256 (1946). The Court found that "the landowner owns at least as much of the space above the ground as he can occupy or use in connection with the land", but that the airspace "above the immediate reaches above the land, is part of the public domain" at 327.

[20] There have been occasional suggestions that there are limits to a landowner's rights in the subsurface. In a decision involving an alleged trespass by hydraulic fracturing, Justice Hecht of the Texas Supreme Court commented that if an aircraft did not commit a trespass by flying two miles above the surface of the earth, then trespass might also not apply two miles below the surface. This observation did not form part of the actual decision in the case: *Coastal Oil & Gas Corp v Garza Energy Trust*, 268 SW 3d 1 (Tex 2008).

[21] *Edwards v Sims*, 24 SW (2d) 619 (Ky Ct App 1929).

solum maxim to the dispute and recognized Lee's ownership of about one-third of the cave[22] and ultimately his entitlement to one-third of the net profits derived from the operation of the cave.[23] Although the case is of little direct authority in Canada, it has been cited in textbooks in both Australia and Canada as a vivid example of the strength of the underlying principle.[24] The maxim strongly suggests that an owner in A's position has the right to exploit the geothermal resources beneath A's lands.

The situation becomes more complex if there is reservation in A's title. The most common example occurs where A owns the surface of the land, but the mines and minerals are reserved to B. To determine the respective rights of A and B, it is necessary to investigate what is included in B's reservation. The reservation clearly entitles B only to substances that can be classified as mines and minerals. The most widely cited approach to the definition of minerals is found in the 1872 decision in *Hext v. Gill*.[25] In that case, James L.J. described the interpretation of the term according to the "vernacular of the mining … [and] commercial world."[26] In the same case, Mellish L.J. seemed to apply the vernacular when he stated:

> "the word 'minerals' includes…every substance…which can be got from underneath the surface of the land for a profitable purpose…unless there is something in the context or in the nature of the transaction which would induce the court to give it a more limited meaning."[27]

The term "mines" does not appear to expand the meaning of minerals. A decision of the House of Lords 16 years after the *Hext* case suggested that mines "must be taken to signify all excavations by which the excepted minerals may be legitimately worked and got."[28] In this sense, the term "mine" describes the means by which the minerals are recovered.

The vital point of all these approaches to interpretation is that the reservation entitles B only to substances that can fairly be described as minerals. Everything beneath the surface that is not a mineral must belong to A.

This fundamental principle was recognised in the leading Canadian case involving the ownership of subsurface resources. In *Borys v. CPR Co.*, Simon Borys acquired farmland in 1906,

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[22] Bruce Ziff, "The Great Onyx Cave Cases: A Micro-History" (2013) 40:1 N Ky L Rev 1 at 27-28 [Ziff, "Great Onyx Cave"].
[23] *Edwards v Lee's Administrator*, 96 SW (2d) 1028 (Ky 1936) at 1033. This paragraph draws heavily from a fascinating article by Professor Bruce Ziff, *ibid*.
[24] Ziff, "Great Onyx Cave", *supra* note 22 at 40, citing Ziff, *Principles of Property*, *supra* note 18 at 110, 113-15 (Canadian reference); Peter Butt, *Land Law*, 3rd ed, (Sydney, LBC Information Services, 1996) (Australian reference
[25] (1872) LR 7 Ch App 699, [1861-73] All ER Rep 388 [*Hext* cited to All ER]. This decision was cited in *Landowner's Mutual Minerals Ltd v Saskatchewan (Registrar of Land Titles)*, [1952] 3 DLR 482 (SKCA) at 484-85.
[26] *Hext, supra* note 25 at 397.
[27] *Ibid* at 392.
[28] *Glasgow Corp'n v Farie* (1888) 13 App Cas 657 (HL) at 679 (per Lord Watson).

subject to a reservation of coal, petroleum, and valuable stone in favour of the Canadian Pacific Railway (CPR).[29] In 1949, the CPR leased all petroleum beneath the land to Imperial Oil. However, Mr. Borys' successor in title asserted that he owned the natural gas beneath his property and that the production of petroleum would interfere with his ownership interest. As the Judicial Committee phrased it, the dispute was "as to what is included under the reservation" and how far the CPR and its lessee could "interfere with the rights of Mr. Borys in things not reserved."[30] In broad terms, the Court found that the CPR reservation covered the rights to liquid petroleum, but not to the substance commonly known as natural gas that existed in the gas cap that is found at the top of the reservoir of petroleum.[31] The decision provides an application of the principle that the surface owner is entitled to everything in the property, except for those substances expressly contained in the reservation.[32]

Although the *Borys* decision involved only the interpretation of a particular deed at a particular time, the courts have so consistently followed its approach to distinguishing the ownership of different subsurface minerals that it has assumed foundational status in Canadian energy law. The underlying principle of the case, that the surface owner holds the rights to all subsurface substances except those specifically reserved or granted to others, is reflected in earlier Alberta cases and in other vivid common law examples.

Historically, the Alberta courts dealt with a number of conflicts over the ownership of subsurface resources. Those decisions were well known at the time, but they are now often overlooked, as they resulted in the passage of statutes designed to permanently resolve contentious ownership issues. In one of the early cases, a surface owner disputed the ownership of an underground deposit of shale in land where there was a reservation of gravel, valuable stone, and mines and minerals.[33] The Alberta trial court followed English precedent, which established that

> the word "minerals" when found in a reservation out of a grant of land means substances exceptional in use, in value and in character…and does not mean the ordinary soil of the district which if reserved would practically swallow up the grant…[and] the true test is what [the term minerals] means in the vernacular of the mining world, the commercial world and landowners at the time of the grant.[34]

[29] [1953] 2 DLR 65 (PC) at 67 [*Borys*].
[30] *Ibid* at 68.
[31] *Ibid* at 73-74.
[32] *Ibid* at 77. The Court in *Borys* stated that "the main strength of the respondents' case is that they have a direct grant of the petroleum, whereas the appellant has merely such residual rights as remain in him subject to the grant to the respondents" at 77.
[33] *Williamson v Hudson's Bay Co*, 19 WWR 337 (ABQB) [*Williamson*].
[34] *Ibid* at 340, citing *Waring v Booth Crushed Gravel Co* [1932] 1 Ch 276 (CA).

The judgment rested on the principle that the surface owner owns all substances in the land except those that were expressly reserved. As shale was not included in the terms "mineral" or "valuable stone", it was not part of the reservation and thus belonged to the surface owner.[35]

In the same era, bitter controversies over the ownership of sand, gravel, clay and marl ultimately came before the Supreme Court of Canada. The key case dealt with the ownership of sand and gravel in farmland where there was a reservation of "'all mines, minerals…coal and valuable stone.'"[36] The trial court had found that the gravel in question was a rare and exceptional deposit. The mineral owner led evidence that gravel was considered a mineral in the "vernacular of the mining world, the commercial world and landowners."[37] In the absence of any evidence on this point from the surface owner, the trial judge felt compelled to adopt this evidence. In contrast, the Court of Appeal found that the reservation could not have been intended to include sand and gravel, as the exploitation of sand and gravel would destroy the surface in a way that was inconsistent with the agricultural use for which the land was acquired.[38] The Supreme Court, echoing the approach to interpretation taken by the Privy Council only two months earlier in *Borys*, simply found that "in the vernacular of engineers, business men and land owners…mines and minerals did not extend to gravel."[39] At common law, the underground deposit of gravel thus belonged to the surface owner.[40]

The traditional common law as interpreted in Canada emphasizes that the surface owner owns everything in the subsurface that is not specifically contained in a reservation or conveyance of mines and minerals or of particular minerals. The UK Supreme Court emphatically applied this principle in 2010. In *Star Energy Weald Basin Limited v*. *Bocardo SA*, Star held a petroleum licence, which entitled it to produce Crown-owned petroleum in an onshore oilfield in England.[41] In order to recover the oil efficiently, Star drilled diagonal wells and installed pipelines at depths of up to 2900 feet beneath land owned by Bocardo.[42] Star did not obtain any permission for these operations from Bocardo, nor did they seek to obtain a statutory right to pursue them under the applicable legislation.[43] Bocardo brought an action to establish that

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[35] *Williamson, supra* note 33 at 372-373.
[36] *Western Minerals Ltd v Gaumont*, 1 WWR (NS) 369 (ABQB) at 372.
[37] *Ibid* at 400.
[38] *Western Minerals Ltd v Gaumont Western Minerals Ltd et al v Brown,* [1952] 1 DLR 143 (ABCA) at 149.
[39] *Western Minerals Ltd v Gaumont Western Minerals Ltd v Brown,* [1953] 1 SCR 345 at 351-352 (*Gaumont* was decided on March 18, 1953. The Privy Council decision in *Borys* was published on January 12, 1953) [*Gaumont* SCC].
[40] This was also the result achieved by legislation which had come into force by the time of the SCC decision. The legislation will be discussed further in Section C.
[41] [2010] UKSC 35.
[42] *Ibid* at paras 1-2.
[43] *Ibid* at para 3.

drilling the three wells constituted a trespass to the subsurface of its lands. Although the litigation directly challenged the applicability of the *cuius est solum* principle,[44] the UK Supreme Court endorsed the view of the Court of Appeal that "the owner of the surface is the owner of the strata beneath it, including the minerals that are to be found there, unless there has been an alienation of them by a conveyance, at common law or by statute."[45] In this case, the Crown had expropriated only the petroleum beneath Bocardo's land, so that Bocardo retained the right to use the subsurface for purposes such as drilling or constructing pipelines.[46]

The application of common law principles suggests that until the proclamation of the *GRDA*, the ownership status of geothermal energy was reasonably clear. If the energy is produced from hot water drawn from the ground, it undoubtedly belongs to the Crown. The *Water Act* vests in the Crown the property in and the right to use and divert all water in the Province.[47] However, in most of Western Canada, it is more likely that geothermal energy will be produced by either the EGS or AGS system. Some commentators suggest that it is an open question whether the geothermal resources would be owned by the surface owner or the mineral owner. Brenda Heelan Powell states that the surface owner has an arguable case for ownership.[48] Nigel Bankes concludes that there is considerable uncertainty as to how an Alberta court would resolve a dispute between the surface owner and the mineral owner over the right to exploit geothermal resources, but states that the *Star Energy* decision would provide the best guidance.[49]

In the author's opinion, it is very likely that at common law the surface owner owns and has a right to exploit geothermal resources. The mineral owner may have an argument that it also has some concurrent rights, but only if it can show that the geothermal energy is stored in a bed of "minerals" within the legal definition of the term. *Star Energy* would surely provide the best guidance in any modern dispute, not least because it is consistent with the historical approach of Canadian courts and particularly with the foundational decision in *Borys.* Neither the EGS nor the AGS system of extracting geothermal resources brings a tangible substance to the surface, other than heat obtained by conduction. The hot rocks or strata from which the

[44] *Ibid* at paras 17-19.
[45] *Ibid* at para 27.
[46] *Ibid* at para 32 (per Lord Hope).
[47] *Water Act*, RSA 2000, c W-3, s 3(2).
[48] Brenda Heelan Powell, "Gaining Steam: A Regulatory and Policy Framework for Geothermal Energy Development in Alberta: Module 2: The Missing Pieces in Alberta's Regulatory Landscape and a Path Forward for Geothermal Energy Development" (October 2020) at 8, online: *Environmental Law Center* <elc.ab.ca/wp-content/uploads/2020/10/Geothermal-Energy-Module-2-The-Missing-Pieces-in-Albertas-Regulatory-Landscape-and-a-Path-Forward-for-Geothermal-Energy-Development.pdf>.
[49] Nigel Bankes, "A Legal Regime for the Development of Geothermal Resources in Alberta" (24 October 2020) at 2, online (blog): <*ABlawg.ca* <ablawg.ca/2020/10/24/a-legal-regime-for-the-development-of-geothermal-resources-in-alberta/> (pdf version).

geothermal energy is drawn remain in place. Even if they contain minerals, the surface owner has the right to work all substances that fall within its ownership rights[50] and thus may incidentally drill through or otherwise interfere with minerals in the course of extracting any heat to which the owner is entitled. In summary, it seems incontestable that the surface owner has considerable rights to the extraction of geothermal heat at common law.

2. The Impact of the *GRDA* on the Ownership of Geothermal Resources

Regardless of whether the ownership of geothermal heat at common law is likely to rest with the surface owner, as is argued in this paper, or is merely controversial, as others have suggested, it is important to examine whether the *GRDA* succeeds in clearly resolving the ownership question once and for all. In order to address this question, it is necessary to first examine the *GRDA* in light of standard principles of statutory interpretation and then to contrast it with other Alberta legislation that was enacted to resolve contests over the ownership of subsurface resources on at least six occasions over seven decades.

a) Does the *GRDA* affect existing rights?

The key question of interpretation is whether the statutory declaration that the owner of the mineral title has the right to explore for and develop geothermal resources precludes any other person from doing so. The Legislature can pass a provision with this effect, but the legislation must be interpreted with the assistance of two presumptions.

Firstly, it is presumed that the Legislature does not intend its law to interfere with vested rights.[51] As Scrutton L.J. stated, "Prima facie, an Act deals with future and not with past events. If this were not so, the Act might annul rights already acquired, while the presumption is against the intention."[52] If the surface owner holds the rights to geothermal rights, they vested at the time the title to land was issued. The *GRDA* contains no suggestion that it annuls or interferes with those vested rights, so it must be presumed not to do so. As Ruth Sullivan explains, "[i]f rights have vested or accrued at the moment new legislation comes into force, it is presumed that the former law under which those rights were acquired survives and that the application of the new legislation is postponed."[53] This statement is fortified by a further and stronger presumption.

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50. *Borys*, *supra* note 29 at 75.
[51] Ruth Sullivan, *Statutory Interpretation*, 3rd ed (Toronto: Irwin Law, 2016) at 363.
[52] *Ward v British Oak Insurance Co Ltd* [1932] 1 KB 392 at 397, cited in G Dworkin, *Odgers Construction of Deeds and Statutes,* 5th ed (London: Sweet and Maxwell, 1967) at 280.
[53] Sullivan, *supra* note 51 at 363, emphasis added.

Secondly, legislation normally takes effect from the date of its proclamation and "it is *strongly* presumed that the legislature does not intend its law to apply retroactively."[54] The GRDA does not overcome either presumption as it does not even contain a hint that it applies to property rights that existed before it was proclaimed.

b) Alberta's Approaches to Resolving Subsurface Ownership Issues

It is hardly surprising in a province with significant mineral wealth that Alberta has faced major problems in settling disputed claims to the ownership of subsurface resources. Given the extent of Alberta's legislative experience however, it is surprising that the province continues to deal with the claims using inconsistent legislative techniques. Since 1949, the province has generally passed retroactive legislation to resolve competing claims to ownership, but in two cases it has departed from this technique.

The first series of acts arose out of the actions of the federal government as European settlement began to spread westward across the prairies. In 1889, the Crown began to reserve mines and minerals from land grants to the new arrivals.[55] The question arose of exactly what resources belonged to the Crown as a result of its reservation. After the federal government transferred the bulk of its land holdings to the respective prairie provinces in 1930, Alberta decided to define the minerals that it owns by virtue of the Crown reservation through amendments to the *Mines and Minerals Act* in 1949.[56] The *Mines and Minerals Act* now states that, where the Crown owns minerals, the term includes all naturally occurring minerals and, in particular, 49 specifically listed minerals.[57] The *Mines and Minerals Act* applies only to mines and minerals owned by the Crown. The *Law of Property Act* deems a different list of 20 substances always to have been minerals, whether or not they exist on Crown or freehold land.[58] However, the list is not exhaustive and does not prevent disputes over whether substances not included in the *Act* constitute minerals at common law.

The definition of what constitutes a mineral was equally important in Canadian cases involving the freehold ownership of mines and minerals. As the discussion of *Western Minerals Ltd v Gaumont* in Section A2 of this paper showed, a dispute over the ownership of sand and gravel arose where one person owned the surface of land and another, whether a freeholder or the Crown, owned the mines and minerals. In that case, the majority of the Supreme Court of

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[54] *Ibid* at 342 [emphasis added]. See *Gustavson Drilling (1964) Ltd v Canada (Minister of National Revenue* [1977] 1 SCR 271 at 279, referring to retrospective legislation.
[55] *An Act to amend and consolidate the several Acts respecting the Public Lands of the Dominion*, 42 Vict 1879, c 31, s 37.
[56] *The Mines and Minerals Act,* SA 1949, c 66, s 2(1)(u).
[57] *Mines and Minerals Act*, *supra* note 16, s 1(1)(p).
[58] *Law of Property Act*, RSA 2000, c L-7, s 56(1).

Canada clearly held the opinion that that the reservation of minerals did not include gravel and that the surface owner was entitled to gravel, even where it was contained in an underground deposit. However, before the case was heard by the Supreme Court, the Alberta legislature intervened.

The *Sand and Gravel Act* stated that sand and gravel were deemed not to be part of the mineral estate and that they belonged to the surface owner.[59] The surface owner was entitled to all surface deposits that could be recovered by surface operations.[60] The passage of the *Act* during the course of litigation was controversial and it was challenged by the mineral owner. Cartwright J. succinctly summarized its nature. The *Act* was declaratory because it was passed to remove doubts about the existing common law. In this case, it was explicitly retroactive, because it deemed sand and gravel "to be and to have been a part of the surface of the land"[61] and it was "declaratory of what is and has always been the law of Alberta."[62] In contrast, the *GRDA* fails to contain either of these elements. It "is not framed in declaratory terms and neither is it expressed to be retroactive."[63]

Alberta took an almost identical approach to the ownership of clay and marl, which had become important in the drilling industry as a source of cementing materials. Both the government and the CPR had relied on their ownership of the mines and minerals to lease clay and marl to cement companies. When a group of farmers began legal action to claim that clay and marl were part of their surface estate in 1961, the government quickly passed pre-emptive legislation.[64] Unusually, the preamble to the *Act* expressed an opinion that clay and marl were "regarded as minerals in the vernacular of the mining world, the commercial world and landowners" and stated that the purpose of the *Act* was to declare that both substances "are and always have been part of the surface of land."[65] The *Act* also limited the rights of the surface owner to substances that can be removed by surface operations, including the stripping of overburden.[66] Like *The Sand and Gravel Act*, the legislation was explicitly retroactive.

In 2010, Alberta passed more draconian legislation with explicitly retroactive effect. The Acts dealt respectively with the ownership of pore space in order to enable carbon capture and

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[59] *The Sand and Gravel Act,* SA 1951, c 77, ss 3-4. The current legislation is contained in the *Law of Property Act,* RSA 2000, c L-7, s 58.
[60] *Ibid*.
[61] *Ibid,* s 4(1).
[62] *Gaumont* SCC*, supra* note 39 at 369.
[63] Bankes, *supra* note 49 at 4 (pdf version).
[64] William G Morrow, "*An Historical Examination of Alberta's Legal System – The First Seventy-Five Years*" (1981) 19:2 Alta L Rev 148.
[65] *The Clay and Marl Act*, SA 1961, c 14, at preamble, paras 1-2.
[66] *Ibid*, s 3. The provisions are now contained in the *Law of Property Act*, RSA 2000, c L-7, s 57.

storage (CCS) and with the ownership of coalbed methane (CBM). Each act had a different purpose.

The CCS legislation was designed to ensure that the government held all the subsurface rights necessary to enable the secure storage of captured carbon dioxide. It achieved the objective in no uncertain terms through two principles. First, it declared that no Crown grant of any land or mines and minerals in Alberta has ever "operated or will operate as a conveyance of the title to the pore space contained in, occupied by or formerly occupied by minerals or water below the surface of that land."[67] Secondly, "the pore space below the surface of all land in Alberta is vested in and is the property of the Crown…and remains the property of the Crown."[68] The principles were further fortified by declarations that they operated whether or not the *Mines and Minerals Act* or any agreement had granted rights to a subsurface reservoir and that pore space was a deemed exception from the original Crown grant of land.[69] Finally, the *Act* removed any right of action that might be commenced as a result of the legislation.[70]

In contrast, the CBM legislation was intended to determine the relative rights of potential freehold owners of CBM rather than to establish government control of underground resources. As was the case in many American states, there were two major claimants to CBM: the owners of coal and the owners of natural gas. The coal owners were generally the successors of the railway companies, which had received major land grants in order to induce the construction of settlement railways. In the face of fears at the turn of the twentieth century that North America might be running out of coal,[71] they began to reserve coal when they transferred lands to agricultural settlers as early as 1904.[72] Natural gas owners in contrast were generally the successors to individual farmers who had acquired their land from railway companies without any reservation or with a reservation of specific minerals, such as coal, petroleum, and valuable stone. As the discussion of the *Borys* decision in section B1 of this paper showed, the reservation of specific minerals often left the farmer with ownership of natural gas. A regulatory decision of the Alberta Energy and Utilities Board in 2007 denied the coal owners' argument that they held the right to exploit CBM and found that those who held licences for natural gas wells were entitled to produce CBM.[73] The decision did not quell the

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[67] *Carbon Capture and Storage Statutes Amendment Act*, 2010, SA 2010, c 14, s 2(6). This legislation added a new section 15.1 to the *Mines and Minerals Act*, RSA 2000, c M-17.
[68] *Ibid*.
[69] *Mines and Minerals Act*, *supra* note 67, s 15.1(1).
[70] *Ibid*, s 15.1(5).
[71] *Amoco Production Co v Southern Ute Indian Tribe,* 526 US 865 (1999) at 868-869.
[72] Janice Buckingham & Patricia Steele, "Coalbed Methane: 'Conventional Rules for an Unconventional Resource'? (2004) 42:1 Alta L Rev 1 at 3.
[73] *Re Bearspaw Petroleum Ltd* (28 March 2007), 2007-024, online: AEUB <static.aer.ca/prd/documents/decisions/2007/2007-024.pdf>.

controversy over the right to CBM. Coal owners pursued a strategy of aggressive litigation when gas owners took steps to produce CBM and the government decided that the resulting uncertainty was hampering the development of the industry.

The CBM *Act* shared some of the features of the CCS legislation. It began with a declaration that coalbed methane is declared to be and at all times to have been natural gas.[74] With certain exceptions for existing agreements that had specifically conveyed rights to CBM, it removed any rights of action against the Crown and any other action resulting from the passage of the *Act*. In addition, the *Act* deemed that the legislation did not amount to an expropriation.[75]

There could be little doubt that this *Act* had extinguished any right that the coal owner may have held to CBM, a conclusion that was swiftly confirmed by the Court of Queen's Bench.[76]

In contrast to the four Acts that were either declaratory in nature or explicitly retroactive, Alberta has twice dealt with competing claims to subsurface rights by more conventional legislation. These Acts appear to speak as of the date of proclamation and, according to the presumptions of statutory interpretation, they cannot be retroactive. This paper has already described the *GRDA* at length, but the natural gas storage legislation of 1994 took the same approach.[77] The *Act* was designed to provide certainty to the proponents of gas storage projects. It stated that a person who owns the title to petroleum and natural gas also owns the storage rights to every underground formation within that land. If one person owns the title to petroleum and another owns the title to natural gas, then they are co-owners of the storage rights. The only exception occurs if operations for the removal of a mineral have created a subsurface cavern, in which case the owner of the mineral is the owner of the storage rights in the cavern.[78]

The analysis of the *GRDA* in this paper strongly suggests that the natural gas storage legislation also fails to provide certainty in the ownership of storage rights because they do not extinguish competing claims. The provisions have never been challenged, but that may be because there are no obvious candidates for ownership outside of the three types of owners identified in the *Act*. The only claimant who might emerge is the surface owner, if storage occurs in a naturally occurring cavern, in contrast to a cavern that is created by the removal of a mineral. As the American litigation over Kentucky caves discussed in section B1 of this paper shows, there is certainly a possibility that the surface owner may also be the owner of a subterranean cave.

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[74] *Mines and Minerals Act*, *supra* note 67, s 10.1(1).
[75] *Ibid,* s 10.1(1)(4).
[76] *Encana Corporation v ARC Resources Ltd*, 2011 ABQB 431.
[77] See *Mines and Minerals Amendment Act*, 1994, SA 1994, c 22. These provisions of the *Mines and Minerals Amendment Act* are now found in the *Mines and Minerals Act*, RSA 2000, c M-17, s 57.
[78] *Mines and Minerals Amendment Act, ibid*, s 16.

However, the possibility would be much reduced if the cave contains some substances that are classified as minerals. If this is the case, a court might well consider the cavern to be a mine as it constitutes a space surrounding a mineral. The cavern might then be found to belong to the mineral owner.

History shows that governments in Alberta have been willing to use retroactive and declaratory legislation to firmly define rights to subsurface resources. As the *GRDA* was designed to provide a foundation for the development of a beneficial source of energy and the availability of storage capacity is vital to the natural gas industry, it is important to examine why the government chose to enact legislation that does not settle the ownership question in either case.

The movement from weak legislation in 1994 to decisively retroactive provisions in 2010 and back to a weak format in 2021 seems to be largely explained by fluctuating philosophies of property rights. From the inception of the modern energy industry in 1947, successive Alberta governments were frequently willing to interfere with the exercise of private property rights in the public interest. One of the purposes of the *Oil and Gas Conservation Act* is to conserve the oil and gas resources of the province[79] and "to provide for the economic, orderly, efficient and responsible development [of oil and gas resources] *in the public interest*."[80] The government has frequently exercised these powers to limit the rights of owners almost to the point of sterilization as, for example, in the severe restriction of the right of the owner of natural gas to produce gas cap gas in order to maximize oil production.[81] At times, legislation has removed a portion of the bundle of rights held by a person with an ownership interest. For example, the government retroactively limited the rights of companies that held Crown leases to the base of the deepest productive zone developed by the lessee. In 1983, "approximately 13,000 continued leases with terms of ten or 21 years 'were severed to remove the deeper rights.'"[82] The deep rights were part of the original lease purchased by the lessee and reverted to the Crown despite protests that the government was forcibly "taking away" potentially valuable rights.[83]

In 1994, the new natural gas storage provisions were unusual because they were the first example of title clarification legislation that was not retroactive. The legislation reflected a strong belief in property rights that had emerged among members of the Progressive

[79] *Oil and Gas Conservation Act*, RSA 2000, c O-6, s 4(a).
[80] *Ibid,* s 4(c) [emphasis added].
[81] *Ibid*, s 39(1)(f).
[82] Allan Ingelson & Will Randall, "Shallow Rights Reversion: Uncertainty and Disputes" (2010) 48:2 Alta L Rev 397 at 399, citing Alberta Energy Information Letter 98-14, "Application of Zone Designations (ZDs) and Deeper Rights Reversion Zone Designations (DRRZDs) for the Sale, Drilling and Production of Split (Shallow/Deeper) and Excepted Petroleum and/or Natural Gas Rights" (29 April 1998).
[83] Ingelson & Randall*, ibid.*

Conservative government elected in 1993. However, this philosophical change was not long lived. A subsequent Progressive Conservative government elected in 2008 showed an unusual willingness to remove property rights with limited compensation. This changed attitude was reflected in both the CCS and CBM legislation described above and in land use planning legislation that is discussed in Section C2 below.

3. Multiple Owners of Minerals

The *GRDA* states that the mineral owner has the right to geothermal resources. Because the CPR began reserving different minerals from their land grants at different dates, it is quite common to find multiple owners of freehold minerals in the same parcel of land. As the *Borys* decision illustrates, it is particularly common to find titles in which there are separate owners of petroleum and natural gas. As there can also be separate ownership of coal, it is easily possible to envisage properties in which there are three separate owners of minerals in the same property.

The natural interpretation of the *GRDA* must mean that each of the mineral owners holds a right to geothermal resources and that a prospective developer must negotiate with and obtain consent from each owner.[84]

C. PROPERTY RIGHTS AND GEOTHERMAL DEVELOPMENT

1. Ownership in Neighbouring Provinces

Alberta's approach to geothermal ownership shows a marked difference to its neighbours. British Columbia passed its *Geothermal Resources Act* in 1996. It opted for Crown control in all cases through the declaration that "[t]he right, title and interest in all geothermal resources in British Columbia are vested in and reserved to the government."[85]

Saskatchewan also chose Crown control, but through a circuitous and somewhat opaque mechanism. Unlike Alberta and British Columbia, Saskatchewan does not have legislation that deals specifically with geothermal projects, but instead it squeezes geothermal power into the regulatory scheme for oil and gas.[86] There has been no attempt to define geothermal resources and, perhaps as a result, there is no statutory declaration of ownership. Instead, Saskatchewan relies on two indirect powers to provide rights to the project developer. In 2019, the developer

[84] A conclusion also reached by Bankes, *supra* note 49.
[85] *Geothermal Resources Act,* RSBC 1996, c 171, s 2.
[86] Brenda Heelan Powell, "Gaining Steam: A Regulatory and Policy Framework for Geothermal Energy Development in Alberta: Module 4: The Regulation of Geothermal Energy Development in Alberta" (October 2020) at 8, online: *Environmental Law Center* <elc.ab.ca/wp-content/uploads/2020/10/Geothermal-Energy-Module-4-Regulation-of-Geothermal-Energy-in-Other-Jurisdictions.pdf>.

of the DEEP Project in south-eastern Saskatchewan announced that it had successfully acquired mineral rights under the *Subsurface Mineral Tenure Regulations*.

The *Subsurface Mineral Tenure Regulations* define subsurface minerals as "all natural mineral salts of boron, calcium, lithium, magnesium, potassium, sodium, bromine, chlorine, fluorine, iodine, nitrogen, phosphorus and sulfur, and their compounds, occurring more than 60 metres below the surface of the land."[87]

In addition, the developer obtained a lease of space from the Crown. A space is defined as "the spaces occupied or formerly occupied by a Crown mineral."[88] The scope of this provision is extremely wide because, unlike Alberta, Saskatchewan defines "minerals" in the broadest possible terms. A mineral refers to "any non-viable substance formed by the processes of nature, irrespective of chemical or physical state and both before and after extraction, but does not include any surface or ground water, agricultural soil or sand or gravel."[89]

The combination of these provisions creates a curious result. There is no doubt that the lease of broadly defined "space" effectively excludes any claim by the surface owner to spaces 3.5 km below the surface of the land. The grant of the specified subsurface minerals seems to allow the developer to use substances such as brine that may be needed for the project. However, neither the lease of space nor the tenure regulations provide any form of right or title to geothermal resources. The developer undoubtedly has the right to pursue its activities, but Saskatchewan may require more particular legislation to resolve the question of ownership of geothermal energy.

2. Ownership and Incentives to Produce

The first requirement of a mineral tenure regime is that it must provide certainty to the project developer. As this paper has demonstrated, all commentators have described the effect of the ownership provisions in the *Act* as uncertain and in this writer's opinion the *Act* fails to extinguish the credible claims of surface owners to geothermal heat. In contrast, there is no doubt that the British Columbia legislation provides a firm basis for geothermal development and Saskatchewan at least provides the developer with an incontestable right to occupy the subsurface spaces necessary for geothermal production, even if it is far from clear on ownership issues.

In the past, Alberta has been willing to pass legislation that clearly defines the right to subsurface resources, except in the case of natural gas storage. The 2010 the legislation that

[87] *The Subsurface Mineral Tenure Regulations,* RRS c C-50.2 Reg 30, s 2; Brenda Heelan Powell, *supra* note 86 at 11.
[88] *The Crown Minerals Act*, ss 1984-85-86, c C-50.2, s 27.2.
[89] *Ibid*, s 2(1)(i).

established the ownership of pore space and coalbed methane can only be described as impregnable. Why did the province not follow a similar model with geothermal resources?

The strong terms of the pore space and coal bed methane provisions attracted little attention outside the energy industry. However, the *Alberta Land Stewardship Act* (*ALSA*) of 2009 elicited dramatic public opposition. *ALSA* was introduced to provide the basis for a comprehensive land use planning system across the province.[90] It was perceived as a massive invasion of property rights and "sparked an unprecedented and intense public debate over property rights."[91] In brief, the *Act* authorised the impairment of property rights to the surface of lands and to subsurface resources. It affected surface rights in two important ways. Once a regional plan was approved, it bound the government, its agencies, and municipalities to make their policies and regulations consistent with the plan. This created the potential for a regional plan to curtail a landowner's rights to the use and development of land. Secondly, a regional plan could declare that an interest in land was subject to a conservation directive that might limit or sterilize the use of land. In respect of rights to natural resources, it allowed a regional plan to rescind Crown licences, leases, and other interests in public natural resources by providing for the cancellation of existing leases, licences, and resource permits, known collectively as "statutory consents."[92] In the case of statutory consents permits, any compensation could be granted only under the parent legislation under which the statutory consent had been granted. The parent legislation usually allowed only a restricted measure of compensation.

Although the criticism of *ALSA* was often overblown, the firestorm of opposition to its provisions, particularly in rural areas, created an intense sensitivity to any legislation which could be interpreted as invading property rights that persists to the present time.

The renewed interest in property rights may well explain the ownership provisions of the *GRDA*, which was passed by a United Conservative Party government that was elected in 2019. Its election platform contained a strong commitment to "further entrench the right to own and enjoy property, and the right not to be deprived thereof without due process of law."[93] The platform would "[t]reat government regulation in the same way as government expropriation for the purposes of compensation" based on the principle "that a government-decreed [loss] warrants compensation."[94] There can be little doubt that if the government had enacted retroactive legislation that declared Crown ownership of geothermal resources or explicitly

[90] *Land Stewardship Act,* SA 2009, c A-26.8
[91] Eran Kaplinsky & David R Percy, "The Impairment of Subsurface Resource Rights by Government as a 'Taking' of Property: A Canadian Perspective" in B Hoops et al, *Rethinking Expropriation Law II: Context, Criteria and Consequences of Expropriation Law II* (Netherlands: Eleven International Publishing, 2016) at 211, 240.
[92] *Ibid* at 242.
[93] "Restoring Public Trust on Property Right" (2019), online: *United Conservatives: Alberta Strong & Free* <albertastrongandfree.ca/restoring-public-trust-on-property-rights/>.
[94] *Ibid.*

extinguished the rights of surface owner and mineral owners, at a political level its actions would almost certainly have been described as an invasion of private property rights.

If the *GRDA* had clearly stated that mineral owners exclusively held all the necessary rights to geothermal resources and had suppressed all competing claims, it would have provided a firm legal base for development. Such an act would have provided a possible source of income to the individuals and corporations who own mineral interests, but it would still have created serious policy concerns. At the time of passage, the *GRDA* was touted as vital in encouraging a nascent industry. It was described as presenting "… greater regulatory certainty for potential investors in development of the significant geothermal resources of the province."[95] In fact, by failing to provide a clear definition of ownership that is secure from legal challenge, it has the opposite effect by creating significant disincentives to geothermal development involving freehold minerals.

Geothermal development is at a nascent stage and requires large capital investments.[96] The *GRDA* adds potentially significant transaction costs as the proponents are forced to deal with each affected mineral owner and to be aware of the possible ownership claims of surface owners. Where mineral ownership is fragmented, the proponent must deal with and negotiate payments to multiple parties, some of whom may have inflated expectations and may use the opportunity to delay a project by acting as a holdout. Geothermal projects can have a large footprint and require significant land assembly costs. The DEEP project in Saskatchewan involves a subsurface lease from the province that extends overs a contiguous block of 39,120 hectares (almost 100,000 acres).[97] Even if the project does not affect each individual hectare, it is safe to say that if the proponent was required to negotiate with each affected freehold owner of mineral rights, there is no chance that the project would reach fruition.

Clearly, Crown ownership simplifies the acquisition of land for geothermal development and entails significantly lower costs than freehold ownership. Government ownership also offers more opportunities for creative policies to encourage an industry that creates few greenhouse gas emissions and can replace carbon intensive fuels in the electrical grid. For example, neither New Zealand nor Iceland charge any royalties for the use of geothermal resources.[98] British Columbia has announced an intention to implement a 3% royalty on geothermal production

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[95] Alexander Richer, "New geothermal regulatory scheme set up in Alberta, Canada" (27 January 2022), online: *Think Geoenergy* <thinkgeoenergy.com/new-geothermal-regulatory-scheme-set-up-in-alberta-canada/>.
[96] Brendan Downey et al, "Pathways to Net-Zero: Opportunities for Canada in a Changing Energy Sector" (2021) 59:2 Alta L Rev 225 at 226, 256.
[97] "Progress Continues for DEEP Earth Energy Production Corp" (21 April 2022), online: *Deep* <deepcorp.ca/progress-continues-for-deep-earth-energy-production-corp/>.
[98] *Ibid* at 260.

after a ten-year royalty holiday.[99] In the past, Alberta has used low royalties to encourage risky energy projects with great success. The province created favourable conditions to allow the oil sands to be developed by charging a minimal royalty between 1% and 5% until the gross cumulative revenues exceeded the gross cumulative costs of the project. At that stage the province levied a high royalty of between 25% and 50% of the net revenues of the developer.[100] It is not possible to create similar financial incentives when the ownership of minerals remains in private hands. Freehold ownership offers mineral owners the opportunity to negotiate royalties in exchange for the right to gain access to their property and removes a real opportunity to encourage the development of a potentially important source of energy through royalty incentives.

The government's decision to vest geothermal rights in minerals owners has been described as a "major point of contention with industry stakeholders."[101] It is likely to have the effect of forcing geothermal development on to Crown lands and thus depriving freeholders of any of the benefits that the declaration of ownership was presumably intended to provide. It cedes a competitive advantage to British Columbia and Saskatchewan, which both appear willing to use the incentives available through Crown ownership to actively reduce the costs of geothermal development. Rather than creating legislative certainty, the *GRDA* stands on an unreliable foundation and discourages the development of geothermal energy in areas that involve the private ownership of minerals.

[99] *Ibid* at 258.
[100] Alberta Energy, *Alberta Oil Sands Royalty Guidelines Principles and Procedures* (2018) at 1, online: <open.alberta.ca/dataset/faf9a465-eeb1-4af0-845a-a79898b6e208/resource/d44e08f1-bf94-473c-82ec-1d4c383278aa/download/osrguidelines.pdf>.
[101] *Ibid* at 259.