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Waste Not Want Not:
A Comparative Analysis and Critique of Legal
Rights to Use and Re-use Produced Water –
Lessons for Alberta

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i

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PREFACE

The energy sector has been a dominant factor in Alberta's development and growth over the last half-century. The large capital investments and operating expenditures associated with finding and producing oil and gas have directly provided a major stimulus to the economy. But the indirect and induced impacts have been equally important. The development of many other industries supplying inputs to the energy sector, the generation of substantial export and government revenues, and the stimulus for large inflows of people have resulted in large 'multiplier' effects. In combination, these have also played a major role in shaping Alberta's 'character' which is generally distinguished by its highly educated, adjustable and entrepreneurial labour force, low unemployment and high labour force participation rates, strong work ethic and sense of self reliance, and its optimistic outlook.

In recent years the energy sector has become even more dominant and has increasingly made Alberta a key driver of the national economy. In a world with a rapidly growing demand for energy, having one of the largest concentrations of energy resources in the world might seem to translate into an assured, prosperous future. There is clearly huge potential associated with unconventional oil and gas, coal, remaining conventional resources and with alternative and renewable energy. However, translating this potential into reality will be daunting. Increasing constraints related to resource access, environmental impacts, infrastructure requirements, and availability of highly qualified people need to be addressed. Other challenges include the massive long-term investments in developing and implementing new technologies and making the right changes in the policy and regulatory framework. Indeed, the fact that relatively few nations have managed to convert resource wealth into high standards of societal welfare is a useful reminder of the magnitude of the challenges.

Alberta is in many respects at a crossroads. On the one hand complacency will almost certainly mean a dimming of the province's long-term prosperity. Declines in the conventional oil and gas sector will significantly dampen growth and prosperity. There are no other sectors of the province's economic base that could realistically expand sufficiently to offset significant declines in the dominant energy sector. On the other hand, visionary, strategic investments today can unlock non-conventional and other energy resources critical to securing a strong and prosperous long-term, sustainable future for the province.

It is in this context that ISEEE has undertaken a series of papers focused on Alberta's energy futures. The intent is to take a longer term look at the challenges, opportunities and choices and what they mean for Alberta's future.

Waste Not Want Not:

A Comparative Analysis and Critique of Legal Rights to Use and Re-use Produced Water – Lessons for Alberta

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Introduction

Produced water is water that results from the process of bringing oil or gas from its source to the surface. As reported by Hum and Tsang *et al.*,² in 2003, the volume of produced water in Alberta was 1.6 million m³/day, which is about 10 million barrels a day, or nearly 1,300 acre feet a day. About half of this amount (0.8 m³/day, or about 5 million barrels or 649 acre feet per day) was injected for reservoir maintenance purposes and enhanced recovery projects. About the same amount was deep well injected into disposal wells. A smaller volume, 16,000 m³/day or 0.1 million barrels or nearly 13 acre feet per day was injected in steam recovery projects, such as the steam assisted gravity drainage (SAGD) thermal recovery process used for in situ bitumen projects. Arguably much of this water was wasted.³

We can expect an increase in quantities of produced water in Alberta once coal bed methane (CBM or natural gas in coal, NGC) exploration and production intensifies. According to Alberta Energy there is an immense amount of natural gas in Alberta's coal beds. It estimates that Alberta's coalbed resource could contain 500 trillion cubic feet (Tcf) of natural gas. The Department figures that this unconventional source of natural gas could help supplement Alberta's recoverable conventional natural gas reserves of 39 Tcf.⁴ Given that Alberta uses about 1.36 Tcf per year,⁵ even though it is not known how much CBM is recoverable, it is clear that reserves could serve Alberta's and others needs for the foreseeable future.⁶

¹ The author thanks third year law student David Burns for his excellent research assistance. The author also thanks the Institute for Sustainable Energy, Environment and Economy for research funding assistance. All research discussion and views are those of the author.

² F. Hum, P. Tsang, T. Harding, and A. Kantzas, "Review of Produced Water Recycle and Beneficial Reuse" publ. by the ISEEE, University of Calgary, 2005, at 3. The authors cite ACCUMAP, commercial database for oil and gas information, accessed November 2004, as their information source.

³ *Ibid.*

⁴ Alberta Energy, "Frequently Asked Questions About Natural Gas in Coal", online at << http://www.energy.gov.ab.ca/364.asp#What_is_the_size>>.

⁵ Alberta Energy, "Energy Facts", online at << <http://www.energy.gov.ab.ca/1899.asp>>>.

⁶ J. Gray, A. Ingelson, A. Rizzuto, "Regulation of CBM Produced Water in British Columbia and Alberta," in materials for Insight Conference, November 14-15, 2005, Calgary, AB, Tab 4, at 1.

CBM is a natural gas trapped in coal seams, a byproduct of the decomposition of organic matter.⁷ The CBM is adsorbed in the coal and where a seam contains water, the water needs to be withdrawn to de-pressurize the reservoir to start production.⁸ CBM produced water is groundwater and, depending on depth and other factors, may be part of or connected to aquifers that service domestic, agricultural, commercial or industrial needs. About 90% of the CBM wells drilled in Alberta in 2004 were dry coal seams, and accordingly did not require dewatering for production. However, the remaining wells in the province at December, 2004 mainly targeted seams that contained water.⁹ Depending on the depth of the coal seam the water may be saline or non-saline. Alberta experts have noted that in some cases it can even be fresh water of drinking water quality.¹⁰

In the western U.S., where CBM production has been ongoing for some time, intense rifts have developed between landowners and environmentalists, operators, and government, over water related impacts from exploration or production. The dewatering and production process itself can impact and contaminate aquifers and pollute groundwater supplies. Local landowners worry about long term impacts from groundwater depletion. Land and water surface discharge of produced water comes with its own host of problems, including erosion, soil salinization to the detriment of agriculture, and aquatic and land ecosystem impairment.¹¹

In Alberta, although CBM production is relatively new, landowner/operator problems are developing. One reason for this is that CBM is regulated like conventional natural gas with a few unique twists. Given the rather mind boggling prospects for CBM production in the future, and likelihood of production from wet coal, the suitability of the conventional model has been seriously questioned. Conventional production requires fewer land impacts (because fewer wells are necessary) and typically conventional wells are much deeper than CBM wells and consequently there are fewer potential groundwater impacts. In response to concerns regarding the CBM regulatory framework, in 2003 the province initiated a CBM regulatory review process headed by the Coalbed

⁷ T. Darin, "Waste or Wasted? – Rethinking the Regulation of Coalbed Methane Byproduct Water in the Rocky Mountains: A Comparative Analysis of Approaches to Coalbed Methane Produced Water Quantity Legal Issues in Utah, New Mexico, Colorado, Montana and Wyoming," *J. Env'tl. Law and Litigation*, [Vol. 17, 2002], at 293, hereinafter "the Darin Article" ..

⁸ The (Alberta) CBM/NGC Multi-Stakeholder Advisory Committee, *Coalbed Methane/Natural Gas in Coal, Final Report*, (Service Alberta: Edmonton, 2006) at 17, available online at <<http://energy.gov.ab.ca/245.asp>>, hereinafter the "CBM/NGC Final Report" hereinafter the "MAC Report".

⁹ *Ibid.*

¹⁰ J. Gray, A. Ingelson, A. Rizzuto, "Regulation of CBM Produced Water in British Columbia and Alberta," in materials for Insight Conference, November 14-15, 2005, Calgary, AB, Tab 4, at 1.

¹¹ See, for example, PowderRiverBasin.Org., "Coalbed Methane Development in Wyoming's Powder River Basin is Transforming the Landscape. PRBRC and Landowners Respond to Prevent Damage" online at <http://www.powderriverbasin.org/cbm/general_background_cbm.shtml> and Wyoming Outdoor Council, "U.S. EPA & Montana Join WOC in Concerns Over CBM Water Discharge" online at <<http://www.wyomingoutdoorcouncil.org/news/newsletter/docs/2001a/h2o.php>>.

Methane/Natural Gas in Coal (CBM/NGC) Multistakeholder Advisory Committee (MAC). In January of 2006 the MAC produced a Final Report.¹² It is notable that 15 of the Report's 43 recommendations specifically deal with water, and many of the remainder have a water-related component.

There are numerous legal and policy issues concerning produced water in Alberta that need clarification or addressing. They include:

- a) initial water rights issues regarding the right to bring produced water to the surface – *Does the operator need a water right permit?*
- b) subsequent water rights issues such as
 - the right to deal with water after it is brought to the surface – *Must it always be re-injected? Can the operator treat it and transfer it for a useful purpose (e.g. irrigation, stockwatering, industrial, or other) for monetary consideration?*
 - the nature of the operator's water rights *vis-à-vis* other water rights holders – *Does the operator have any water right priority over produced water, before or after it is treated?*
- c) aquifer impacts issues – *What are the operator's common law and regulatory obligations and liabilities for impacts to aquifers that cause or potentially cause injury or damage to the environment or to other aquifer users?*
- d) water discharge issues – *What are the operator's common law and regulatory obligations and liabilities regarding water discharge?*

Although all of these issues are of great interest to operators and those affected by oil and gas operations, this paper focuses on a) and b) above. The paper demonstrates inadequacies in Alberta's legislative framework governing the initial granting of water rights in respect of produced water and governing a water right holder's ability to put produced water to a purpose other than simply bringing a resource to the surface. The paper also critically assesses two U.S. state water rights frameworks regarding produced water with the aim of shedding light on the best path forward for Alberta.

Part I describes water scarcity in the Province. It points out that because of scarcity, we should be looking at whether the use of produced water could alleviate water shortages. Part II cautions that we should be careful using the expression "beneficial use of produced water" in Canada, since this expression can lead to confusion given differences between western U.S. water law and western Canada water law. It explains that this paper uses the term "useful purpose" in respect of Alberta water rights and reserves the term "beneficial use" for western U.S. rights. Part III considers how two U.S. states with considerable CBM production experience – Colorado and Wyoming -- deal with the initial granting of rights to produce water and rights to put produced water to a beneficial use. Part IV reviews Alberta's legal and policy water rights framework. It points out numerous shortcomings in the framework that make it difficult for the system to

¹² The MAC Report, *supra* note 8.

accommodate or facilitate to re-use produced water for a useful purpose, and leave the regulatory system wanting. Part V considers the lessons learned from Colorado, Wyoming, and Alberta. It makes recommendations to begin to develop a suitable regulatory water rights framework for Alberta for the re-use of produced water.

II

Water Scarcity in Alberta and the Need for New Sources

Water is scarce in Alberta, especially in southern Alberta. According to background studies produced in connection with the province's South Saskatchewan River Basin ("SSRB") Management Plan, ("SSRB studies")¹³ there are about 20,000 withdrawal allocation statutory authorizations in respect of the SSRB. The SSRB includes the sub-basins of the Red Deer River, Bow River, and the Oldman River. The basin's urban centres include Calgary, Lethbridge, Red Deer and Medicine Hat. The basin contains all of the province's thirteen irrigation districts, whose licenses account for about 75 percent of the total volume of allocations. Because of actual and potential water scarcity, the Alberta government accepts no water allocation licence applications for the Bow, South Saskatchewan, and Oldman sub-basins in the SSRB.¹⁴ According to the government's water supply outlook service, for August – September 2006, natural runoff volumes are much below average. Volumes in parts of the Bow River (which runs from the mountains in Banff then east through Calgary) are the lowest in 91 years. Natural runoff volumes in the Oldman River basin ranged from 5th to 10th lowest, except for a location in the Belly River where they were the lowest on record.¹⁵ The Alberta government has acknowledged that in some areas of the SSRB all allocations cannot be satisfied and accordingly junior allocators – those whose licence applications were made later in time than more senior allocators – have frequent, and even substantial deficits.¹⁶ Assessment of 33 river reaches identified in the SSRB studies for riparian and aquatic condition revealed that 31 range from near or approaching ecologically unacceptable values to below ecologically acceptable values.¹⁷ There is not enough water in this basin to meet

¹³ Alberta Environment, *South Saskatchewan River Basin Water Management Plan Phase Two: Background Studies* (Edmonton: Alberta Environment, 2003) hereinafter "SSRB Studies". This document, as well as all government publications and the water supply service referred to in this article are available through the Alberta Environment website at <<http://www3.gov.ab.ca/env/water/>>. Parts of this topic are based on the author's work in the following publications: A. Kwasniak, "Water Scarcity, the Alberta Water Act, the Water for Life strategy", *LawNow* (2004), pp. 9-11; M. Wenig, A. Kwasniak, M. Quinn, "Water Under the Bridge: The Role of IFNs in Alberta Water Management", proceedings of "Water: Science and Politics," the 2006 Annual Conference and Workshop of the Alberta Society of Professional Biologists, forthcoming.

¹⁴ Alberta Environment, *Approved Water Management Plan for the South Saskatchewan River Basin (Alberta)* (Edmonton: Alberta Environment, 2006) at vi.

¹⁵ Alberta Environment, *Water Supply Outlook*, (October 2006) online: Alberta Environment <<http://www3.gov.ab.ca/env/water/ws/watersupply/>>.

¹⁶ *SSRB Studies*, *supra* note 12 at 10-12.

¹⁷ *Ibid.* at 16.

existing water allocations, not enough for the system itself, and not enough to attract new users to this dry region.

Water conservation and moving from supply side management approaches to demand side management approaches will go some way towards addressing water shortages.¹⁸ However, it is unlikely not at all clear that these approaches will be sufficient. This is especially so when factoring in climate change. It makes sense to consider new sources in Alberta. Produced water is an obvious source for consideration, especially produced water from CBM operations which may be fresh or only marginally saline.

Part II

“Useful purpose” vs. “beneficial use”

“Beneficial use” – a U.S. concept

Discussions regarding the use of produced water for a purpose other than bringing a resource to the surface typically employ the idea of putting produced water to a “beneficial use”.¹⁹ The phrase is attractive since it captures the idea that water that was not used for any beneficial purpose (except, perhaps in the limited sense that it can assist in oil and gas production) is used for purposes that benefit users others than operators, such as irrigators, livestock producers, municipalities, a variety of industrial and other users. Nevertheless, technically it is not correct to use “beneficial use” in relation to Alberta and other western provinces’ water rights systems. Although the phrase “beneficial use” plays a critical role in U.S. water law, it has no formal role in statutory allocation rights systems in the Canadian prairies. Indeed, to understand, compare, and assess water rights models to use and re-use produced water, it is critical to correctly use and understand the notion of “beneficial use”. Hence, in this paper, “beneficial use” is used only with respect to U.S. water rights frameworks, and the term “useful purpose” is used for Alberta water rights frameworks.

Beneficial use plays a number of roles in water law in the western U.S. water law. Two key roles particularly relevant to produced water are:

- a) beneficial use is the “measure and the limit of an appropriation right;”²⁰ and
- b) a licence purpose is allowable only if law recognizes it as a beneficial use;

¹⁸ The province’s *Water for Life* strategy set a 30 percent improvement in the efficiency and productivity of water use between 2005 and 2015 (Edmonton: Alberta Government, 2003) at 27, online at <www.waterforlife.gov.ab.ca/docs/strategyNov03.pdf>.

¹⁹ See for example, the papers cited in notes 2 and 6.

²⁰ J. Sax et al, *Legal Controls of Water Resources*, third edition (West Group, American Casebook Series: St. Paul, 2000) at 122.

Regarding a), prior allocation water rights systems in the western United States originally developed to meet the needs of miners on federal lands. Miners needed water and water rights based on riparian ownership or occupancy did not facilitate mining development. A water rights system evolved based on the principle of prior appropriation – an earlier appropriator who put water to a beneficial use had prior rights to water for that use than any later water appropriators. In time prior appropriation rights extended to farmers and other users of water for use on public or private lands. U.S. appropriation rights are common law rights that courts recognize and enforce as a species of property rights. The property right is perfected when water is taken from a natural stream or lake and is applied to a beneficial use, without waste, and with due diligence.²¹ A water right does not come into being until water is put to a beneficial use. Courts enforce appropriation rights as against other appropriators in accordance with the first in time first in right principle (FTFR). Earlier appropriation rights have greater right (priority) to water put to a beneficial use than later appropriation rights.

Regarding b), in the western U.S. what constitutes a “beneficial use” primarily is a product of court decisions. Although state legislation may list uses that are recognized beneficial uses,²² no appropriation state legislation has shut the door to new beneficial uses recognized at common law.²³ Historically prior appropriation states recognized household uses, agricultural uses, municipal uses, and industrial uses as beneficial uses. Over time lists grew so, for example, now many states even recognize, either statutorily or through case law, recreational, or instream uses²⁴ as beneficial uses. The common law door is open for states to recognize new beneficial uses, or possibly to eliminate existing uses as beneficial uses.²⁵

²¹ *Ibid.*, at 98.

²² See D. Getches, *Water Law in a Nutshell* (West Publishing Co.: St. Paul, 1997) at 98 for a chart setting out beneficial uses recognized in prior appropriation states by statute or case law.

²³ For example, the Alaska legislation defined “beneficial use” to mean “a use of water for the benefit of the appropriator, other persons or the public, that is reasonable and consistent with the public interest, including, but not limited to, domestic, agricultural, irrigation, industrial, manufacturing, fish and shellfish processing, navigation and transportation, mining, power, public, sanitary, fish and wildlife, recreational uses, and maintenance of water quality”. See Title 46 A.S. § 15.260.12. The Arizona definition is “Beneficial use” includes but is not limited to use for domestic, municipal, recreation, wildlife, including fish, agricultural, mining, stockwatering and power purposes.”, see Title 45 A.R.S. § 7.1 definitions of “beneficial use.”

²⁴ For a summary regarding states recognizing instream uses as beneficial uses see Annear et al, *Instream Flows for Riverine Resource Stewardship*, (rev. ed.), (Instream Flow Council: Cheyenne, 2004) at 74-75.

²⁵ Sax et al, *supra* note 19 at 125, raise the question of whether the rule “once a beneficial use always a beneficial use” is written in stone. They refer to an Idaho Supreme Court judgment in which the court stated “the concept of what is or is not a beneficial use must necessarily change with changing conditions. ... we cannot say that such uses [specified by the State Constitution] will always be beneficial ... there is always the possibility that ... uses beneficial in one era ... will not be in another.” See *State, Dept. of Parks v. Idaho Dept. of Water Admin.*, 96 Idaho 440, 530 P.2d 924, 931 (1974) (Bakes, J., concurring). An interesting question is whether a determination that a use is no longer beneficial (e.g. water intensive agriculture in the desert) would constitute a taking of property. An argument against is that since beneficial use is the measure and limit of an appropriation right, where a use is no longer beneficial the right is not taken away, it simply no longer exists.

Alberta’s “prior allocation” and statutory water diversion rights

In contrast to the western U.S. states, FTFR water rights in Alberta are statutory rights. The Alberta government *allocates* water to users pursuant to statutory authority in contrast to users in western U.S. states *appropriating* water in accordance with common law and legislation. Hence statutory FTFR rights in Alberta are prior allocation rights, in contrast to western U.S. prior appropriation rights. Whether an Alberta statute that creates water rights confers a property right has not been settled by law, though legal scholars have suggested that they do not.²⁶ The point about property rights is not critical to this paper, but in any event, there is no case authority in the prairie provinces that recognizes prior allocation rights as property rights. What is critical to this discussion is the core nature of an Alberta prior allocation right. In Alberta “beneficial use” is not the *measure* or the *limit* of a prior allocation right. In fact, although historically an Alberta water rights statute mentioned “beneficial use”, the notion plays no formal, legal, role in determining the nature of an Alberta water right.²⁷ There likely was not need to incorporate the notion of “beneficial use” into legislation since the legislation itself sets out the *measure* and *limits* of a prior allocation right. As explained in greater detail in Part IV, under Alberta legislation, the water right is *the right to divert* and the measure and limits are the quantity of water, rate and diversion point stated in a licence, expressed purpose or purposes for the diversion (if any), stated conditions of use (if any), and applicable rights and limitations under prevailing legislation.

Part III

Produced water and beneficial use in the western U.S. – two key jurisdictions

Beneficial use and produced water

Produced water invariably is groundwater, even though at source it may be connected to surface streams or bodies of water. Western U.S. states typically treat groundwater rights differently from surface water rights. How “beneficial use” features with respect to groundwater rights varies from state to state. This Part looks at how the water rights systems of two U.S. states -- Colorado and Wyoming -- treat the initial use of water involved in oil or gas production and then at how they treat subsequent re-use of produced water for other purposes. In both of these states considerable amounts of water

²⁶ See, for example, A. Lucas, *Security of Title in Canadian Water Rights*, (Canadian Institute of Resources Law: Calgary, 1990) at 31. Note that this claim only is made of licensed water allocation rights and not of water rights generally. Riparian rights for domestic use– the limited common law right of riparian owners and occupiers to use water for household purposes -- have to a degree survived water resource legislation. Riparian rights are property rights.

²⁷ The original Alberta *Water Resources Act* gave the Minister the right to examine studies of water sources to assist in determining potential beneficial uses (*Water Resources Act*, S.A. 1931, c. 71, s. 36(b)).

are produced from oil and gas activities. Recent focus has been on produced water and CBM development owing to increasing CBM development in these states. The states were chosen because of a key difference in how each state water right system initially deals with produced water. Colorado's law does not consider producing water as part of oil and gas developments to be a beneficial use, and accordingly, it must legally accommodate this use outside of its water rights regime. Wyoming takes a different tack. It considers that water facilitating or being a part of bringing CBM (but not conventional or gas) to the surface to be a beneficial use in and of itself. This Part discusses shortcomings and regulatory complexities of each approach in order to shed light on legal and policy issues involving the right to use and re-use produced water.

Colorado

Produced water as waste

In 2002 there were over 2000 wells producing CBM in the two producing basins in Colorado (San Juan and Raton). There are between 2,000 and 3,000 additional wells planned over the next 10 years.²⁸ A 2006 U.S. government report indicates that annual groundwater withdrawals from Colorado CBM wells increased from 1.45 billion gallons (about 5.49 billion litres) from 480 wells to 3.64 billion gallons (over 13 billion litres) from 1,568 wells during the years 1999.²⁹ The rapid increase in wells and future projections indicate that enormous amounts of water will be produced.

Colorado, like a number of other western U.S. states, considers water brought to the surface in oil and gas production to be waste. Produced water just happens. Under this view, produced water technically is not appropriated and so it does not need to be put to a beneficial use. We will see that such mental and legal gymnastics does not provide the soundest basis for a legal water regime for produced water, especially where enormous quantities are produced with numerous known and a multitude of indefinite environmental and social impacts.

How produced water is regarded from a water rights perspective in Colorado depends on the classification of the source groundwater. In Colorado, there are five types of groundwater.³⁰ Tributary and non-tributary are most relevant to this discussion:

- ♦ *Tributary* means groundwater that is hydrologically connected to a natural stream by either surface or under ground flows, and
- ♦ *Nontributary* means groundwater outside of any designated ground water basin where it has been determined that the withdrawal of the water will not, within 100

²⁸ The Darin Article, *supra* note 7, at 311.

²⁹ See K. R. Watts, "A Preliminary Evaluation of Vertical Separation between Production Intervals of Coalbed-Methane Wells and Water-Supply Wells in the Raton Basin, Huerfan and Las Animas Counties, Colorado, U.S.D.I. and U.S.G.S., Scientific Investigations Report 2006-5109, at 1.

³⁰ These are: tributary, non-tributary, not non-tributary, designated, and geothermal. For a discussion of all five types see D. Wolfe, and G. Graham, "Water Rights and Beneficial Use of Coal Bed Methane Produced Water in Colorado", Colorado Division of Water Resources, Denver, Colorado, October, 2002, at 2, hereinafter the "Wolfe and Graham Article".

years, deplete the natural flow of a stream an annual rate higher than one tenth of one percent of the annual rate of withdrawal.³¹

Groundwater rights from a tributary source are based on a modified prior appropriation water rights system. Therefore, in order to obtain a ground water right in Colorado, the water must be put to a beneficial use. However, groundwater rights from a non-tributary source are based on the percentage of land owned by the surface owner. In other words, the right to use groundwater from a non-tributary source is tied to ownership of the surface land, and not to prior appropriation. Where there are a number of landowners who own land above a non-tributary source, they have, roughly speaking, pro rata right to use the groundwater. At Colorado law there is a presumption that groundwater is tributary, and a person claiming that a source is non-tributary faces a “very rigorous” test.³²

A number of questions may be asked regarding the use and re-use of produced water given this legal overview:

1. If the right to use tributary groundwater requires that the water be put to a beneficial use, how does a operator obtain a right to divert groundwater in oil and gas exploitation activities, where the operator has no plan to put the water to a beneficial use? That is, the operator simply wants to produce an energy resource and needs to divert water in order to do so.
2. How does an operator put produced water from a tributary groundwater source to a beneficial use? That is, how does the legal character of the water change from waste to beneficially used water?
3. When a source is non-tributary, how can an operator who does not own a surface interest obtain a right to produce water to exploit oil or gas resources?
4. How can an operator who does not own a surface interest put non-tributary groundwater to a beneficial use?

Colorado has dealt with 1 and 3 in part by removing produced water that is not put to a beneficial use from the FTFR water rights system.³³ It does this by classifying produced water as waste water. Produced water is not subject to the state water diversion authority, the state engineer, the Colorado Division of Water Resources (CDWR), who has jurisdiction over beneficial uses of water. A person seeking a groundwater diversion right for a beneficial use through a well must obtain a permit from CDWR.³⁴ However, taking produced water outside of the beneficial use sphere and legally characterizing it as

³¹ *Ibid.*

³² Bureau of Land Management, National Science and Technology Centre, *Western States Water Laws, Colorado* (BLM, U.S. Government, 2001) at 2.

³³ For a general discussion of the classification in J. Sax, B. Thompson, J. Leshy, and R. Abrams, *Legal Controls of Water Resources, Cases and Materials*, 4th ed. (St. Paul: Thompson West, 2006) at 414.

³⁴ *Col. Revised Stat.* §37-92-301. (1) The state engineer shall be responsible for the administration and distribution of the waters of the state, and, in each division, such administration and distribution shall be accomplished through the offices of the division engineer as specified in this article.

waste water removes CDWR jurisdiction. Instead, permitting to extract produced water along with the sought resource and the disposal of produced water are subject to state energy resource authorities, the Colorado Oil and Gas Conservation Commission (COGCC) and water quality regulator, the Colorado Water Quality Control Division (CWQCD).³⁵

Applying COGCC rules to produced water leads to much waste. Under the rules there are 4 acceptable ways to deal with produced water: re-injection, putting it in evaporation/percolation pits, using it in approved commercial facilities, road spreading, and discharging into state waters provided that state water quality and other requirements are met. The rules also allow for limited use for enhanced recovery and related purposes, or to provide an alternate domestic supply to surface owners within the oil and gas field. However the last mentioned use is limited and provides little incentive for operators to offer water for this use. The rules deem such use to inure solely to the benefit of local surface owners. In other words, any beneficial use is not attributable to the operator's use but rather is the local surface users' beneficial use. The rules call this use "mitigation" while explicitly stating that the mitigation in no way implies that dewatering processes have impacted the vested interests of local groundwater users. Since the water is still waste from the operator's perspective COGCC jurisdiction is retained. If the beneficial use was that of the operator, then the state engineer's office would acquire jurisdiction. The rules avoid the shift of jurisdiction by deeming produced water used on local owners land to, in effect, replace local owners' water that dewatering might have depleted, without implying that the operator's dewatering actually caused any such depletion! Practically speaking, this bending over backwards to enable limited beneficial use without a transfer of jurisdiction is not likely to result in much re-use of produced water. This is because to put water to this use the operator must first ensure that the water meets state water quality standards and this may require water treatment. However, since the operator may not sell or trade the water³⁶ there is little or no incentive for this use, except to gain the good graces of the locals.

Putting wastewater to a beneficial use

Determining how the operator may put produced water to a beneficial use addresses # 2 and #4 above. This is because in the operator putting water to a beneficial use the water loses its character as "waste" and thus falls within the state's ordinary water appropriation rights system under the jurisdiction of the CDWR. The CDWR issues groundwater permits under the 1965 *Groundwater Management Act*.³⁷ If a source is tributary, (for which, as mentioned above, there is a strong presumption) the applicant must demonstrate that unappropriated water is available.³⁸ Where water is not available, then presumably existing water rights holders would have a right to the produced water in accordance with their priorities. This is the case even if the operator treated the water to bring it up to a quality so that it could qualify for beneficial uses. In addition the applicant

³⁵ See J. Sax, *supra* note 19. at 414.

³⁶ COGCC Rule 907(c)(4).

³⁷ Colo. Rev. Stat. Ann. §§ 37--101 to 143.

³⁸ Colo. Rev. Stat. § 37-90-137(1) and (2).

must demonstrate no material interference with vested water rights. Addressing #3, where water is non-tributary, the legislation exempts operators from the land ownership requirement and so the operator's right to use is not based on land ownership. As well, the operator need not prove that there is unappropriated water available. However, the applicant must show no material interference with vested water rights.³⁹ Unless a source is already established as non-tributary, a determination must be made by the Ground Water Commission.⁴⁰

Critique of the Colorado approach

A significant problem with the Colorado approach is that it denies the CDWR initial jurisdiction. Given the huge amounts of water produced in the state, the fact that some of it only marginally saline and some even potable, the potential for contamination of aquifers,⁴¹ and impacts on holders of ground water rights, including potential interferences with priority,⁴² it is remarkable that the office that regulates water rights is out of this picture when the initial authority to produce water is given.

Another problem is that classifying produced water initially as waste offers little incentive to move beyond this classification. In Colorado water is scarce and a different regulatory climate might facilitate re-use of produced water to help address low supplies. Much of the state's CBM produced water is of low salinity and is or could easily be made suitable for beneficial use.⁴³ Surely if operators in Colorado had to consider, straight off, whether water that they produce could be put to a beneficial use, especially if it is of a low saline quality or better, less of this water would be wasted or only put to minimal useful purpose and more would be put to beneficial uses.

Finally, the number of cooks involved in regulating produced water tend to spoil the broth. The COGCC, the CWQCD, and the CDWR, all could have a vital role in regulating produced water in the public interest. But conflicting mandates and overlapping jurisdiction almost guarantee that the end product will not be as palatable as it should be. From an industry, prior water rights holders, and environmental perspectives, a one window approach where all agency concerns are dealt with, would be preferable.

Wyoming

Produced water: byproduct water or beneficially used water

Most of Wyoming's CBM is found within the Powder River Basin, which it shares the Montana. The basin is one of the most productive CBM reservoirs in the United States. Wyoming's share of total recoverable reserves is estimated at 31.7 Tcf of gas. From 1987

³⁹ Colo. Rev. Stat. § 37-90-137(7).

⁴⁰ Colo. Rev. Stat. § 37-90-106.

⁴¹ U.S. Geological Survey, Energy Resource Surveys Program , USGS Fact Sheet FS-019-97, available online at << <http://energy.usgs.gov/factsheets/Coalbed/coalmeth.html>>>.

⁴² U.S. Geological Survey, Energy Resource Surveys Program , USGS Fact Sheet FS-019-97, available online at << <http://energy.usgs.gov/factsheets/Coalbed/coalmeth.html>>>.

⁴³ Darin Article, *supra* note 7, at 313.

to December, 2005, cumulative water production was just over 380,000 acre feet (almost 469 million litres), most of which came from the Powder River Basin. Water quality varies from relatively high (within or close to drinking water quality) through to fairly saline. Along this matrix water is usable for a variety of uses including irrigation and stockwatering.⁴⁴

The Wyoming water rights regime governing produced water is intriguing. Under Wyoming law, by-product water means “water which has not been put to prior beneficial use, and which is a by-product of some nonwater-related economic activity and has been developed only as a result of such activity.”⁴⁵ The state oil and gas agency, the Wyoming Oil and Gas Conservation Commission (WOGCC), regulates by-water that has not been put to a beneficial use, namely the “[d]isposal of salt water, nonpotable water, drilling fluids and other oil-field wastes which are uniquely associated with exploration and production operations”.⁴⁶ The Wyoming Department of Environmental Quality (WDEQ) regulates water quality aspects relating to disposal of water.

Up to 1997 Wyoming law considered all produced water to be by-product water. However, in 1997 the State Engineer’s Office (SEO) declared the production of water for CBM development to be a beneficial use.⁴⁷ Thus Wyoming legislation distinguishes between conventional water production and CBM non-conventional water production. This distinction, *prima facie*, makes sense from a water conservation point of view, since CBM produced water in Wyoming normally substantially exceeds conventional produced water quality. As well, there is more potential for CBM extraction to impact vested water rights than with the production of conventional oil and gas since conventional production wells are considerably deeper than CBM wells. Accordingly there is sense to having all CBM water initially under the auspices of the SEO, even if that water sometimes will be brackish. However the initial plausibility of producing water a beneficial use *per se* breaks down on examination of the nature of the beneficial use related to the dewatering of coal for CBM production.

CBM produced water may be put to a different beneficial use, and conventional oil or gas produced by-product water may be put to a beneficial use, though through these processes an operator might lose all or part of the right to the water. To put water to a beneficial use or a new beneficial use the operator must obtain a permit from the state engineer’s office (SEO).⁴⁸ In the usual case this will be water which the operator has stored and upgraded as necessary to qualify for a beneficial use, or in the case of CBM

⁴⁴ All of the information under this heading to this point is from Ruckelshaus Institute of Environment and natural Resources, “Water Production from Coalbed Methane Development in Wyoming: A Summary of Quantity, Quality and Management Options”, University of Wyoming, December, 2005, available online at <<http://www.uwyo.edu/enr/ienvr/cbm.asp>>, hereinafter “Ruckelshaus Report”.

⁴⁵ Wyo. Rev. Stat. § 41-3-903.

⁴⁶ Wyo. Rev. Stat. § 30-5-104(d)(ii) D.

⁴⁷ Ruckelshaus Report, *supra* note 43, at 35.

⁴⁸ Wyo. Rev. Stat. § 41-3-904.

produced water, a change of beneficial use. The water is subject to the FTFR system and the SEO has the right to make an order establishing priorities. Where a junior appropriation right interferes with a senior one, the SEO may make a finding of unreasonable interference.⁴⁹ The SEO could order, for example, the junior cease appropriation until the senior right is satisfied. With water that has already been withdrawn, in theory, the SEO could order that the senior appropriator has better rights over the treated water than the junior appropriator.

Critique of the Wyoming approach

One problem with the Wyoming approach is that the so-called “beneficial use” of water in the CBM production process stems from the fact that this beneficial use is incongruous with commonly recognized beneficial uses such as stockwatering, agricultural, municipal, instream, commercial or industrial uses where there is an appropriation (a claiming or taking of water) and a subsequent putting the water to a beneficial use. By contrast, according to Wyoming law, with dewatering the taking of water alone is the beneficial use. In an attempt to explain how releasing water from coal can be a beneficial use, SEO documents state that after the initial “appropriation” in the dewatering process there is no additional beneficial use, and the water is then considered to be unappropriated,⁵⁰ like non-consumptive appropriations such as for hydropower developments or for instream flow.⁵¹ This explanation leaves much to be desired. First, it borders on the perverse to compare CBM produced water with beneficial uses with a 100% return flow (e.g. hydropower) or with uses that do not involve water leaving its source (e.g. instream uses). Unless CBM water is put to a further beneficial use, except for any produced water discharged into Wyoming waterways, the water will be re-injected or otherwise substantially wasted. Water with a 100% return flow is available for further beneficial uses. Second, with hydropower or instream uses there is both a claiming of water and a separate beneficial use. With hydropower the beneficial use is the production of electricity and with instream uses it can be one or more of a variety of benefits such as pollution assimilation, recreation enhancement, aesthetic improvements, or aquatic habitat restoration.

Another problem is that considering CBM dewatering to be a beneficial use encourages no further beneficial use. It takes effort and incentive to change the status quo. Moreover calling the production of water a “beneficial use” gives the impression that it the water was put to a useful purpose, when in fact, it was put to no purpose at all or only minimal following the extraction.

⁴⁹ Wyo. Rev. Stat. § 41-3-911.

⁵⁰ Memo to the State Engineers Office from Patrick Tyrrell, A Revised Interim Policy Memo, p.1, that outlines how the SEO handles groundwater permits. This memo is referenced (note 31) in a response by the Wyoming Outdoor Council, filed on its behalf by the Watershed Protection Attorney, Steve Jones, to a petition to amend Wyoming Water Quality Rule, Chapter 2, Appendix H, document 05-3102. The Response is available online at <<http://deq.state.wy.us/eqc/Docket/05-3102%20PRBRC%20WQD%20Ch%202%20Petition/Response%20to%20AG%20Opinion.2006-01.WOC.pdf>>.

⁵¹ Ruckelshaus Report, *supra* note 43, at 35. The Report bases this analogy on a personal communication with H. LaBonde of the SEO office on May 16th, 2005.

A further problem concerns the notion of “waste”. In Wyoming, as in the other prior appropriation states, a key element of the notion of “beneficial use” is that water must not be wasted.⁵² Putting water to beneficial use means to put it to a beneficial use recognized by law without waste. In Wyoming, like other prior appropriation states, the SEO may ask the Attorney General to bring action against any appropriation right holder who wastes water.⁵³ A potential problem for the beneficial use of conventional produced water or a change of beneficial use for CBM produced water is that given the huge quantities of water involved, it is highly unlikely that none of it would be wasted.⁵⁴

Finally, like in Colorado, the number of agencies and overlapping and sometimes inconsistent or conflicting mandates involved in the regulation of produced water unnecessarily complicates the regulatory system and results in regulatory deficiencies. For example, the WOGCC’s and the WDEQ’s handling of the disposal of water recently came under considerable fire. Numerous affected landowners commenced a petition to the Wyoming Environmental Quality Commission urging an amendment to rules under the state *Environmental Quality Act* to ensure that the WDEQ has the right to limit *quantities* of discharged water and not just the right to regulate the overall quality of discharged water, without setting limits on dischargeable quantities.⁵⁵ The petitioners argued that they, their livestock, their farms and ranches, as well as wildlife and ecosystems suffered grievous damage because of the lack of WDEQ quantity limitations. The WDEQ, on the other hand, takes the position that it lacks jurisdiction to impose quantity limits arguing that this would be interfering with SEO jurisdiction which its legislation prohibits.⁵⁶ The result is that the quality in water that receives discharged produced water is poor, with no agency willing to step up to the plate to address it.

⁵² See text *circa* note 20.

⁵³ Wyo. Rev. Stat. §41-2-111.

⁵⁴ See the Darin Article, *supra* note 7 at 330. Darin points out that in the Power River Basin there are a total of 500,000 cattle and sheep. One cow or seven sheep drinks about 14.5 gallons (about 54.9 litres) of water per day. Peak production in the Basin produces nearly 700 million (about 2, 650 litres) of water per day. If produced water were used to provide water to sheep and cows in the Basin, the Basin “would be overrun with over 45 million cows or 325 million sheep”.

⁵⁵ Petition to amend Wyoming Water Quality Rule, Chapter 2, Appendix H, document 05-3102

⁵⁶ The *Environmental Quality Act* provides that “Nothing in this act limits or interferes with the jurisdiction, duties or authority of the state engineer “ and a number of other agencies. See Wyo. Rev. Stat. § 35-11-1104. In the Wyoming Outdoor Council’s response to the petition, (*supra* note 50) S. Jones argues that SEO jurisdiction in effect terminates once the initial appropriation – the dewatering – has occurred and therefore there can be no interference with SEO jurisdiction.

Part IV

The Alberta system and lessons from the U.S.

Historical background to Alberta water diversion rights

Alberta and other prairie provinces' water rights are based on two common law theories: the English riparian doctrine and the American prior appropriation doctrine.⁵⁷ The former became applicable in Canada as part of the body of common law inherited from England;⁵⁸ the latter, though never a part of the Canadian common law, influenced the development of water legislation in the prairie provinces.

Prior to the prairie provinces' joining confederation (Manitoba 1870, Saskatchewan and Alberta 1905), the federal government solely regulated water rights in the prairies. The federal government realized early that riparian water rights system would not attract settlers to this arid region. In 1894 Parliament passed the *Northwest Irrigation Act*⁵⁹ which introduced a water rights system based largely on the principle of FTFR. As mentioned in Part II, the principle in Canada is called "prior allocation" in contrast to the United States' "prior appropriation" because in Canada governments *allocate* first in time first in right water entitlements in accordance with water legislation whereas in the western states early users *appropriated* rights. Hence in Canada the nature and scope of a water right largely is a matter of public law, in contrast to the western U.S. states where water rights developed at private law. In the prairie provinces priority is based on date of completed application to the public authority, in contrast to the date of appropriation for a beneficial use.

The federal government transferred ownership of public lands and resources to the prairie provinces through natural resources transfer agreements in 1930.⁶⁰ The recipients then developed their own water rights legislation, based on the federal Act. For example, in 1931 the Alberta Legislature passed the *Water Resources Act*.⁶¹ Although amended many times, this Act remained law in Alberta until January 1, 1999 when the *Water Act*⁶² came into effect and repealed and replaced its predecessor.⁶³

⁵⁷ A. Lucas, *Security of Title in Canadian Water Rights*, Calgary: Canadian Institute of Resources Law, 1990, p. 4.

⁵⁸ D. Percy, *The Framework of Water Rights Legislation in Canada*, Calgary: Canadian Institute of Resources Law, 1988, at 3.

⁵⁹ S.C. 1894, c. 30.

⁶⁰ The agreements are attached as Schedules 1, 2, and 3 to the *Constitution Act*, 1930, Appendix II (formerly *British North America Act* (1930), 20-21- George V, c. 26 (U.K.)).

⁶¹ S.A. 1931, c. 71.

⁶² S.A. 1996, c. W-3.5 hereinafter the "*Water Act*".

⁶³ Up to this point in this Alberta section the text is adapted from A. Kwasniak, "Quenching Instream Thirst: A Role for Water Trusts in the Prairie Provinces" (2006) 16 J.E.L.P. 211, at 218-219.

Alberta water diversion rights

As explained in Part II, it can be confusing to talk about the “beneficial use” of produced water in Alberta. Alberta’s water rights are statutory diversion rights and the notion of “beneficial use” plays no formal legal role. Accordingly, this paper uses the term “useful purpose” when discussing purposes for which water can be put in the province under a water right.

The key to understanding Alberta water rights is that they are *diversion* rights and not rights that arise from already having diverted water and putting it to a beneficial use. The *Water Act* defines “diversion” to mean:

- (m) “diversion of water” means
 - (i) the impoundment, storage, consumption, taking or removal of water for any purpose, except the taking or removal for the sole purpose of removing an ice jam, drainage, flood control, erosion control or channel realignment, and
 - (ii) any other thing defined as a diversion in the regulations for the purposes of this Act⁶⁴

Note that this definition does not even mention “use”. Under Alberta law, a diversion is not putting water to a use. It simply is the taking, removing, storing, or consuming water from a source.

Types of water diversion rights

A right to divert under the *Water Act* can take a number of forms. The most common is a *licence* to divert water.⁶⁵ A licence gives the holder the right to divert water from a specified source for a purpose recognized in regulations under the Act,⁶⁶ in accordance with any licence conditions. There are a number of other diversion rights under the Act. A *registration* is a diversion right held by “traditional” agricultural users who were diverting up to 6,250 cubic metres of water a year for pesticide application or stockwatering prior to the Act coming into force in 1999 who registered their use prior to 2002.⁶⁷ A *preliminary certificate* is not a diversion right *per se*, but rather is a virtual guarantee of a diversion right in the form of a licence if certain conditions are met.⁶⁸ A legislated *exemption* is a right to divert water without a licence or other further statutory authorization. The main exemption is the *household user* exemption that enables riparian owners and occupiers or owners or occupiers with groundwater to use up to 1,250 cubic

⁶⁴ *Water Act*, *supra* note 62, s. 1(m). No regulation further defines “diversion”.

⁶⁵ *Ibid.*, Part 4, Division 2.

⁶⁶ *Ibid.*, ss 49-51 and *Water Act (Ministerial) Regulations*, Alta. Reg. 205/1998, s. 11.

⁶⁷ *Ibid.*, Part 4, Division 4. The actual quantity of water that can be diverted (up to 6,250 cubic metres a year) is based on the amount of water actually used for these purposes prior to the Act coming into force, and priority goes back to first use.

⁶⁸ *Ibid.*, Part 4, Division 3.

metres of water a year for household purposes without a licence.⁶⁹ Another common one is the *exempt agricultural users* exemption. This enables farmers or agricultural producers who used up to 6,250 cubic metres of water per year for pesticide application or stockwatering prior to the Act coming into force (January 1, 1999) who did not register their use by 2002 to continue that use, without priority.⁷⁰

Of particular interest to this paper are *regulatorily exempt diversions*. The authorizing provision reads that a person who “commences or continues the diversion of water ... that is designated in the regulations as exempt from the requirement for a licence ... is not required to hold a licence for that diversion of water.”⁷¹ The regulations specify a number of exemptions, including the one discussed in the next section -- diversions of saline water – an exemption that is of great relevance to the oil and gas industry.

Rights to divert saline produced water

In Alberta, the nature of the statutory right to divert produced water depends on whether the diverted water is saline or not. This is because the *Water (Ministerial) Regulation* under the *Water Act* provides that:

The following diversions of water and any operations of works associated with those diversions do not require a licence:

... (e) a diversion of saline groundwater;⁷²

The Regulation defines “saline groundwater” to mean “water that has total dissolved solids exceeding 4000 milligrams per litre”.⁷³ This means that saline groundwater may be diverted through the exploration or production process from its source, normally a permeable geological formation, without a licence under *Water Act*. It does not mean, as the author has often enough heard, that the *Water Act* does not apply to diversions of saline water. The *Water Act* does not cease to apply to water simply because a diversion is exempt from the licensing provisions. Under the *Water Act* the “property in and the right to the diversion and use of all water in the Province is vested in Her Majesty in right of Alberta except as provided for in the regulations.” An exemption does not change this.⁷⁴

A number of provisions are relevant to regulatorily exempt diversions. For example, the purposes apply, which recognize the need to “manage and conserve water resources to sustain our environment and to ensure a healthy environment and high quality of life in the present and in the future”.⁷⁵ The priorities and the enforcement of priorities provisions apply. Under the Act household users have no priority *vis-à-vis* each other, but have priority over licenses and registrations.⁷⁶ Licensees and registrations have priorities

⁶⁹ *Ibid.*, ss. 21-23.

⁷⁰ *Ibid.*, s. 24.

⁷¹ *Ibid.*, s. 49(2)(e)..

⁷² *Water (Ministerial) Regulation*, *supra* note 67, Schedule 1, 1(e).

⁷³ *Ibid.*, s. 1(z).

⁷⁴ *Ibid.*, s. 3(2).

⁷⁵ *Ibid.*, s. 2(a).

⁷⁶ *Ibid.*, s. 27.

among themselves in accordance with the priority number assigned to a licence or registration.⁷⁷ The Act specifically states that exempted agricultural users have no priority.⁷⁸ Neither the Act nor the regulations specifically express whether other exempt diversions have a priority. In any case, even if they had some common law priority *vis-à-vis* each other (for which there is no evidence known to the author), for the purposes of administering priorities they certainly would be behind household users, registrations, and licensees. Accordingly, under the Act, if one of these diverters complain that an exempted saline water diversion has interfered with a diversion with a priority, an administrator under the Act could issue an order requiring the saline water diverter to cease diverting or to “cause the works of the person responsible for the diversion of water to be closed, or take any other action that is necessary to ensure that the supply of water to which a household user, licensee or traditional agriculture user is entitled can be diverted by the household user, licensee or traditional agriculture user in accordance with the household user’s, licensee’s or traditional agriculture user’s priority”⁷⁹.

Saline diversions and regulation by the Energy and Utilities Board

Where a diversion was exempt because it was of water with more than 4,000 TDS ppm, although no *Water Act* licence is required, statutory authorization for production and disposal is required from the Energy and Utilities Board (EUB) pursuant to the *Oil and Gas Conservation Act*.⁸⁰ The EUB requires, as a matter of policy, that all produced saline water be returned to the zone of origin, if that zone is below base of groundwater protection. This means the base of an aquifer that Alberta Environment defines as containing usable groundwater, meaning a “strata capable of producing water with a total dissolved solids content of less than 4,000 mg/L” (or ppm).⁸¹ If the zone of origin is above the base of groundwater protection, then the produced saline water must be returned to a lower zone than the base of groundwater protection.⁸²

Non-saline diversions

Where water to be diverted in oil and gas operations is below 4,000 TDS ppm the operator must obtain a water diversion licence under the *Water Act*. The operator must comply with the “Guidelines for Groundwater Diversion for CBM/NGC Development.”⁸³ The Guidelines require the CBM/NGC operator to complete a preliminary groundwater assessment, a technical report, and an application. Public notice

⁷⁷ *Ibid.*, s. 30.

⁷⁸ *Ibid.*, s. 19(1).

⁷⁹ *Ibid.*, s. 32.

⁸⁰ R.S.A. 2000 c.O-6, s. 37 and 39(1)(c). *EUB Requirements for Disposal of Produced Water* presentation made by Tom Byrnes to Water Working Group. Online at: http://www.waterforlife.gov.ab.ca/docs/water_disposal_wwg.pdf.

⁸¹ Energy and Utilities Board/Alberta Geological Survey, “Base of Groundwater Protection” available online at <http://www.ags.gov.ab.ca/activities/Groundwater/base_groundwater_protection.html>.

⁸² See EUB guide ST-55: *Alberta’s Usable Groundwater Base of Groundwater Protection Information*, released in June 1995, EUB Directive 065: *Resources Applications for Conventional Oil and Gas Reservoirs* and Directive 051.

⁸³ Alberta Environment (2004), online at <<www3.gov.ab.ca/env/water/Legislation/Guidelines/groundwaterdiversionguidelines-methgasnatgasincoal.pdf>>.

of the application is required and there will be opportunities for participation by directed affected parties. In addition to quantities to be diverted the licence will address the disposal of non-saline produced water. The Guide states that Alberta Environment and the EUB may consider surface discharge or re-injection of non-saline produced water. The federal Department of Fisheries and Oceans may need to approve surface water body discharge.⁸⁴

Re-use of produced water

Introduction

Academics and scientists contend that much produced water can be treated and be thus made acceptable for a variety of uses. Hum and Tsang describe a number of available water treatment technologies that could be used to upgrade produced water to various degrees of usability, including industrial, commercial, irrigation, agricultural, and human use.⁸⁵ They, however, note the need for the development of clear guidelines regarding both the ownership of produced water and the transfer of it for “beneficial use.”⁸⁶ Substituting the term “useful purpose” for “beneficial use,” Hum and Tsang thus note the need for the development of clear rules regarding the ownership of produced water and the transfer of it for a *useful purpose*, meaning a purpose such as irrigation application, commercial or industrial, livestock watering, replenishing aquatic systems for instream needs, and so on. Being scientists and not legal academics it is no surprise that Hum and Tsang do not provide an analysis of what is “unclear” about the current legislative framework for ownership and re-use non-saline and of saline produced water. The following sections set out this framework and conclude that indeed there is serious need to develop clearer, more appropriate rules.

Non-saline water --initial authorization allows re-use

One way for operators to be authorized to re-use non-saline water for a useful purpose would be for the operator to negotiate licence terms initially that allow re-use. The Guidelines for Groundwater Diversion for CBM/NGC Development already suggest that surface discharge may be acceptable. This may accommodate the re-use for irrigation and other agricultural purposes. However, for other re-use, government policy revisions would be necessary.

Non-saline water -- amendment to licence

What if an operator’s licence requires re-injection or other undesired disposal method, and the operator wishes to, instead provide the water (for a price, presumably) to others for useful purposes? The operator cannot do this without violating *Water Act* since the Act prohibits a person from knowingly or unknowingly commencing or continuing the diversion except in accordance with the licence.⁸⁷ Even though the diversion technically

⁸⁴ *Ibid.* at 3. The Department of Fisheries and Oceans approval may be necessary under s. 35 of the *Fisheries Act* (R.S 1985, F-14) which require approval for an operation or works to legally that cause a harmful alteration, disturbance or destruction of fish habitat, or s. 36 which requires an approval (unless a regulation applies) for the release of any deleterious substance into water frequented by fish.

⁸⁵ F. Hum, P. Tsang *et al.*, *supra* note 2.

⁸⁶ *Ibid.*, at 35.

⁸⁷ *Water Act*, *supra* note 62, ss. 142(1)(n) and 142(2)(e).

has ceased once the water has been diverted from its geological source, the licence condition regarding disposal continues to apply, just as any conditions in a licence that govern how diverted water may be used continue to apply after a diversion. May the operator apply to Alberta Environment to change the condition relating to disposal so that the operator can transfer the water to buyers for useful purposes?

The language of the *Water Act* poses difficulties for the operator. Nothing the *Water Act* specifically enables a licensee to apply to a Director⁸⁸ to remove or change a condition of a licence, except conditions relating to points, rates, or timing of diversions.⁸⁹ The *Water Act* also specifically enables a licensee to apply to amend a licence to “add terms or conditions to the licence.”⁹⁰ A problem is that removing a disposal requirement is not adding a term or condition. It is removing a condition. Arguably there is a measure of discretion in the amendment provisions⁹¹ such that a court might read into them the right of a director to remove a term and change the purpose of a licence, but ideally the Act would be more specific. In any event, a Director may not amend a licence if of the opinion that there could be an adverse effect on the rights of household users, other licensees, traditional agricultural users, or if the change would adversely affect the ability to “conserve or manage a water body”.⁹² Note that there is no mention of priorities and so this provision applies whether the adverse impact could be on a licensee or more senior or more junior to the operator.

Transfer of a licensed non-saline to a useful purpose?

Another possibility is that an operator might transfer an allocation so that the water may be used for useful purposes. Although the *Water Act* enables transfers of all or part of an allocation,⁹³ it is clear from the provisions that they contemplate ongoing diversions where the activity of diverting water is to be transferred from one parcel of land to another. The provisions are written to apply to a situation, for example, where a licensee, say Farmer Smith, who has an allocation relating to a parcel of land, call it “Green Acres” does not need the allocation (or part of the allocation) any more and transfers the allocation (or part) to someone else, say, Industrialist Jones, who will use the allocation at another location, say “Jones’ Industrial Park”. The provisions do not contemplate simply a transfer of already diverted water to other users. Accordingly the transfer provisions will not help an operator who has a licence that requires disposal and the operator wishes to transfer diverted water for a useful purpose.

⁸⁸ Directors carry out many key functions of the *Act* involving licences and other authorizations. The *Water Act*, *supra* note 62, s.163 enables the Minister to designate “Directors”.
“Director”

⁸⁹ *Ibid.*, s. 54(1)(b)(i),(ii),(iv),(v) and (vi).

⁹⁰ *Ibid.*, s. 54(1)(b)(iii).

⁹¹ *Ibid.*, s. 54(1)(b) reads that the Director may, on application of the licensee, amend a licence “including but not limited to” the specific matters mentioned in the text of this paper. The use of “including “ suggests that the Director may consider amendments of kinds other than those set out. However, by application of the statutory interpretation tool *expressio unius est exclusio alterius*, (expressing one thing, excludes another) the specificity of the provision that a Director may amend a licence to “add terms or conditions to a licence” suggests that the Director may not remove terms or conditions to a licence.

⁹² *Ibid.*, s. 54(1).

⁹³ *Ibid.*, ss. 81-83.

Assignment of a licensed allocation for useful purposes?

The *Water Act* enables a licensee or person holding a registration to temporarily assign water under a licence or registration to another licensee or person holding a registration where, because of limitations of water supplies there is not enough water for the assignee to divert the assignee's entire allocation.⁹⁴ These provisions, like the transfer provisions, were not intended to apply to already diverted water. In fact the section specifically states that "an agreement to assign water may not be made with respect to water that already has been diverted."⁹⁵

Summary – putting diverted non-saline water to a useful purpose

This discussion has shown that there are significant gaps in the Alberta's legislative scheme to deal with putting diverted non-saline water to a useful purpose. Unless the re-use for a useful purpose was contemplated at the stage of the initial licensing, the Act does not well accommodate changes to allow re-use for useful purposes. The next section shows that the legal situation is even more uncertain for diversions of saline water.

Re-use of non-saline water

Introduction

We saw that in Colorado water produced as a part of oil and gas operations is not a beneficial use of water and so the state exempts it from the permitting process of the state engineer. If an operator wants to put produced water to a beneficial use the operator could apply to the state engineer for a water permit to do so. In Wyoming dewatering of mines is initially a beneficial use and so an operator needs a water permit to produce water in the context of CBM operations. If an operator wants to put the water to another beneficial use, the operator must apply to the state engineer for a change of beneficial use relating to that water.

How does it work in Alberta? The main complexity and difficulty for an operator in Alberta who wants to put saline produced water, before or after treatment, to a useful purpose lies in the fact that the original diversion was exempt. Walking through the relevant provisions of the *Water Act* exposes the difficulties.

Subsection 3(2) provides that "the property and the right to the diversion *and use* of all water in the Province is vested in Her Majesty in right of Alberta except as provided in the regulations" [emphasis added]. "Water" is defined to include groundwater.⁹⁶ The specification that the Crown owns the right to *use* water might suggest that the Crown regulates changes of use following an exempt diversion of saline water. Although the

⁹⁴ *Ibid.*, s. 33.

⁹⁵ *Ibid.*, s. 33(2).

⁹⁶ *Ibid.*, s. 1(ff).

Crown may regulate in this manner, as we will see, it has not yet done this in the *Water Act* or regulations under it. This lacuna is the rub for operators.

Recall that subsection 49(1) prohibits a person from commencing or continuing a diversion of water for any purpose except “pursuant to a licence unless it is otherwise authorized by clause 49(2)(d).” That clause provides that a “person who commences or continues the diversion of water ... that is ... part of a class of diversions ... designated in the regulations as exempt from the requirement for a licence ... is not required to hold a licence *for that diversion*...” [emphasis added]. The regulations exempt diversions of saline water and so no licence is required for a diversion of saline water in oil and gas activities. How does an operator move from a water right that arose because the diversion was of saline water to a water right to use the water for a useful purpose? If the exemption in the regulations stated a purpose for the exempt diversion, then subsection 49(1) would prohibit an operator from diverting water for any purpose other than the purpose of the exemption. But the regulations do not specify a purpose. The exemption simply reads “The following diversions of water ... do not require a licence ... (e) a diversion of saline water”.⁹⁷ Once an operator diverts saline water from its underground source to the surface in connection with oil and gas activities, the water is diverted. There is no further diversion of water and nothing under the *Water Act* requires anything specific to be done with the water. It is not like other exempt uses, such as a household exemption, where once water is removed from the source, it must be used for certain purposes, namely household purposes.⁹⁸ If a person with a household exemption wished to use diverted water for some other purpose, the person would have to apply for a licence to use diverted water for the other purpose. But there are no such restrictions with respect to the diversion of saline water.

Can an exempt saline diversion be transferred or assigned for a useful purpose? As mentioned earlier the *Water Act* transfer provisions are very limited and are not appropriate for produced water situations. In any case, only a transfer of an allocation under a licence may be transferred.⁹⁹ An exempt diversion does not require a licence and so the transfer provisions are inapplicable. Similarly, the *Water Act* assignment provisions¹⁰⁰ are inapplicable to exempt diversions. They are relevant only to diversions under licenses or registrations.

Would the offence provisions prohibit an operator from using produced water for a useful purpose? Clause 141(1)(n) of the *Water Act* states that it is an offence to commence or continue a “diversion of water for any purpose ... except under a licence or as otherwise authorized by this Act”. Clause 141(2)(e) is identical except that it applies to a person who knowingly commences or continues a diversion without statutory authorization. It is difficult to see how these provisions could apply to an exempt

⁹⁷ *Water (Ministerial) Regulation*, Alta. Reg. 205/98, Schedule 3, s. 1(e).

⁹⁸ *Water Act*, *supra* note 62, s.21(1).

⁹⁹ *Ibid.*, s. 81.

¹⁰⁰ *Ibid.*, s. 33.

diversion that does not mention a purpose, save to divert saline water. Accordingly, a person would be committing an offence if the person diverted non-saline water allegedly under the saline exemption. However as long as an operator diverts saline water in accordance with an exemption, it is hard to see how the operator could commit an offence if the operator then used the water for some other purpose. This would seem to put operators in a particularly favored situation vis-à-vis other water users who would be committing an offence if they used diverted water for purposes other than authorized purposes.

So does this mean that an operator may treat saline water and transfer it for a useful purpose without having to worry about obtaining further authorizations? Certainly the operator must get approval from the EUB to alter any previous disposal requirements set out in an EUB authorization. But does the operator need further authorization (in addition to the exemption) under the *Water Act*?¹⁰¹ The review of the Act and regulations set forth above suggests not. However, since the Crown owns the water and the right to use it, it always would be prudent to make an inquiry to a Director under the *Water Act* regarding whether it is permissible to use saline water or treated saline water for a useful purpose.

Part V

General Observations, Lessons Learned, and Recommendations for Alberta

Overall approach to water rights

This paper has shown how none of the three jurisdictions has a water rights legal system that rationally accommodates and facilitates the re-use of produced water for a useful purpose. The author believes that the core reason for this is that these water rights

¹⁰¹ A number of other statutory authorizations may be required to upgrade and use the water or transfer the water for a useful purpose. For example, produced water could likely fall under the definition of “wastewater” in regulations under the *Environmental Protection and Enhancement Act*, R.S.A. 2000 c. E-12, s. (EPEA), *Wastewater and Storm Drainage Regulation*, Alta. Reg. 119/1993 § 1. Treated wastewater may be used for drinking if it meets the treatment guidelines in the federal Canadian Drinking Water Quality and the provincial Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems as required under the *Potable Water Regulations*, Alta. Reg. 277/2003 §6(1). To use treated wastewater for irrigation an operator must either comply with a Code of Practice under EPEA or *Wastewater and Storm Drainage Regulations*, *supra* this note, § 9(1). .. definitions provide:

- (r) “wastewater” means domestic wastewater and may include industrial wastewater;
- (f) “industrial wastewater” means wastewater that is the composite of liquid and water carried wastes from a plant;
- (j) “plant” means all buildings, structures, process equipment, pipelines, vessels, storage and material handling facilities, roadways and other installations, used in and for any activity listed in section 2 of the Schedule of Activities in the Act, including the land, other than undeveloped land, that is used for the purposes of the activity;,, such as

systems were designed to or evolved to accommodate and facilitate diversions for useful purposes (or beneficial use in the U.S.), such as diversions for household uses, irrigation, livestock watering, industrial or commercial activities, for producing hydropower, or for enhancing recreation, tourism, aquatic ecosystem needs, or other instream uses. They were not designed to accommodate or facilitate diversions that simply happen in the course of some other activity. None of the three approaches examined—considering water production in oil and gas operations as being beyond water rights systems (Colorado and others), considering CBM water production in these activities as a beneficial use (Wyoming) or making the diversion itself the basis of a water right (Alberta) – could provide a reasonable and appropriate water management framework for produced water re-use rights.

It is beyond the scope of this paper to make detailed recommendations on the basis of lessons learned from the regulatory frameworks reviews. However, it is in order to make general observations and general recommendations for law and policy reform in Alberta.

General observations and lessons learned

The initial characterization of a water right to produced water should not act as a disincentive to putting water to a useful purpose

Colorado, like a number of other western U.S. states, considers water brought to the surface in oil and gas production to be waste. Wyoming considers producing water in connection with CBM operations to be a beneficial use of water. Alberta exempts saline water from the licensing provisions. In all three cases the initial characterization suggests that there is only one purpose or use of the water (waste or accompanying resources to the surface). It takes effort in Wyoming and Colorado to change this characterization, and under Alberta law, for saline water, it might not even be possible to change it. Making the initial characterization of the water right contemplate a useful purpose, or at least a potential useful purpose, would help address this disincentive.

Regulatory frameworks that require perverse or twisted interpretations to make produced water fit into them should be rectified.

In all three jurisdictions regulators and policy makers perform mental gymnastics in order to fit produced water into water rights frameworks designed for water rights issued for activities that are directly water related. But surely there are ways to fit produced water into water rights frameworks in a straightforward, sensible manner. Water legislation and policies should be reviewed and changed to remove distortions.

Legislative approaches should avoid jurisdictional tug-of-wars, conflicting mandates, and regulatory gaps

The rights to produce and re-use produced water in all three jurisdictions involved a number of regulatory agencies. These were an agency that issues water rights (state engineer in the states, Alberta Environment, water rights division in Alberta), an environmental agency that deals with water quality, and a resource exploration and development agency. The paper has shown that conflicting mandates and overlapping

jurisdiction almost guarantee unnecessary complexities and regulatory gaps. To avoid this, governments should ensure that all three agencies work together to ensure proper resource management in the public interest. To better accommodate industry, a one-window approach should be adopted as far as possible and reasonable, however care must be taken to ensure that all agency mandates and interests are addressed.

Involve the water rights agency up front

Following on the last observation, in two jurisdictions (Colorado and Alberta) problems can arise because the water rights agency was not involved up front. This is especially true where the activity of producing water could interfere with other water rights holders. Issues of potential priority impacts can only be adequately dealt with if the proposed water right is considered by the water rights agency before the right is granted or approved. To involve the rights agency up front, produced water – especially from shallow resource developments --- should not be considered waste nor should there be an exemption.

Alberta specific recommendations

On the basis of the analysis in this paper, the following Alberta specific recommendations are made:

Legislators should revisit basing all (or any) Alberta water rights on diversions of water.

This paper has shown that a major difficulty for operators is rooted in Alberta's basing water rights on diversions. One problem involves obtaining a water right to put saline water to a useful purpose. Since water rights are based on diversions, once an exempt diversion is complete there is no mechanism in the Act to enable the water to be licensed for a useful purpose. A way of addressing this difficulty might be to not base all (or any) water rights on diversions.¹⁰² Water rights in the western U.S. are based on beneficial use.¹⁰³ In the Canadian prairies, only Alberta bases water rights on diversions of water. Water rights legislation in Manitoba enables the Minister to issue a licence "to any person who applies therefore, authorizing ... the *use or diversion* of water for any purpose"¹⁰⁴ [emphasis added]. Accordingly a Manitoba water right may be a right to use or a right to divert. The Saskatchewan legislation gives considerable discretion to its administrator to grant licenses and does not even mention purpose of use.¹⁰⁵

Review the saline water exemption

Where there is a reasonable possibility that a water diversion could impact other water users, whether the impact concerns quality or quantity, there should be no exemption for

¹⁰² It is worthy of note that dropping the requirement for a diversion would also clearly open up the door for privately instream licences. The current definition of "diversion" in the *Water Act* is ambiguous with respect to whether an instream use could be considered to be a diversion. See discussion in A. Kwasniak, "Quenching Instream Thirst: The Potential for Water Trusts in the Prairie Provinces", *supra* note 63, at 24-227.

¹⁰³ All states require an appropriation, though not all states require that the appropriation involve a diversion.

¹⁰⁴ *Water Rights Act*, C.C.S.M. c. W80, s. 5.

¹⁰⁵ The *Saskatchewan Watershed Authority Act*, S.S. 2005, c. S-35.03, ss. 50-52.

saline diversions. Although there may be justification for the exemption in respect of conventional oil and gas because wells are very deep and there is, allegedly, little chance for aquifer impact, the same justification does not apply to shallower unconventional CBM wells. Wherever there could be aquifer dewatering impacts on other users, or quality impacts from migrating gas or other events, there should be no exemption, whether or not the produced water is saline. The entire schema of the *Water Act* depends on water rights with priority not being impacted by junior rights and there should be no exemptions from the licensing provisions where a junior right could impact a senior one.

Exemptions must be for a stated purpose

In any event, the *Water Act* should be amended to ensure that all exemptions are for a purpose. This paper has shown that a shortcoming of the Act is that there is a lack of regulatory tools manage exempt diversions that are not exempt for a stated purpose. The legislation also should clarify that any use of water other than for the exempt purpose requires a licence.

Licensed produced water diversions must be for a purpose

Similarly, any licence issued in respect of produced water must set out the purpose for the diversion. This way any use other than for stated purposes will be prohibited by the *Water Act*.

Contemplate re-use in initial authorization

To avoid the initial characterization of a water right acting as a disincentive to re-use, appropriate legislative and policy changes should be made so that re-use of licensed produced water diversions is contemplated in the initial authorization. The specific re-use need not be stated in the initial licence. It could be tied to (future) regulations and guidelines that regulate re-use of produced water.

Revise Guidelines for Groundwater Diversions for CBM/NGC Development

The Guidelines should be amended to allow for useful purposes of CBM produced water. Regulations and guidelines should be developed to ensure appropriate and safe use in the public interest.

Amend Water Act to allow for limited changes

The *Water Act* should be amended to allow for change of purposes and the removal of licence conditions to accomplish this.¹⁰⁶ This amendment should be carefully proscribed and limited, but it should enable produced water to be put to a useful purpose when this use was not contemplated at the initial water right authorization.

Revise offence and penalty provisions

The offence and penalty provisions of the *Water Act* should be amended to make it an offence to use water subject to an exemption for any purpose other than the purpose for

¹⁰⁶ See discussion *circa* note 88.

the exemption.¹⁰⁷ The Act also must be clear that water diverted under an exemption cannot be used for another purpose without a licence under the Act.

Water conservation guideline regarding waste

The government should develop a water conservation guideline respecting wastage of water. The guideline could set out standards and policies regarding the re-use of produced water.

Holdback mechanism

The government should consider whether there should be a holdback-type mechanism¹⁰⁸ where an operator “sells”¹⁰⁹ produced water for useful purposes. A holdback could achieve a number of purposes. It could reserve water to mitigate local impacts. It could help restore water to water systems to meet or enhance instream flow needs. It could help address concerns (if any) that the industry is making a profit off of water – a public resource – without returning water to the system.

All mandates addressed in a one window approach

Alberta Environment (both water quality and water quantity divisions) and the EUB should, as far as possible, develop a one window approach for water rights relating to produced water. It is essential that all mandates are appropriately addressed within such approach.

¹⁰⁷ See discussion *circa* note 98.

¹⁰⁸ The transfer provisions of the *Water Act* enables conservation holdbacks of up to 10% of the amount being transferred where allowed by Cabinet order or in an approved water management plan. See *Water Act*, *supra* note 62, s. 83.

¹⁰⁹ “Sells” is in scare quotes because underlying ownership of water remains in the Crown.