WATER RESOURCES AND OIL AND GAS DEVELOPMENT: A SURVEY OF NORTH DAKOTA LAW

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I. INTRODUCTION

North Dakota is experiencing a tremendous increase in both oil and gas development. From 1982 through 2007, North Dakota's producing oil wells had numbered in the 3000s, but in 2008 and 2009, that number grew

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into the 4000s and in 2010 into the 5000s.[1] From 1980 through 1987, North Dakota oil production ranged in the forty and fifty million barrels per year.[2] Then, it slumped, but in 2007, it was in the 40s again, in 2008 in the 60s, in 2009 in the 70s, and in 2010 over 113 million barrels annually.[3] The Bakken formation accounted for 75.6% of North Dakota oil production in 2010, up from 62.1% in 2009.[4] As with oil production, gas production in North Dakota has grown in recent years. From 2009 to 2010, gas production in North Dakota increased by 20,897,052 MCF[5] with the Bakken formation accounting for fifty-six percent of North Dakota gas production in 2010, up from thirty-eight percent in 2009.[6] Therefore, for both oil and gas development, the Bakken formation is the key to the future in North Dakota.

This kind of development increase elsewhere in the United States has raised major questions about the use or abuse of the water resource.[7] As to developing an oil well, the North Dakota State Water Commission projects the amount of water needed for developing a Bakken well is around three acre feet; thus, with the projected growth in production through 2019, Bakken wells could require as much as 51,000 acre feet (a.f.) of water.[8] Non-Bakken oil wells could use up to 0.3 a.f. per well, meaning the total acre feet of water used for non-Bakken wells could be up to forty-five a.f. of water per year for several years.[9] Further, as of 2009, North Dakota had

1. DEP'T OF MINERAL RES., N.D. INDUS. COMM'N, NORTH DAKOTA ANNUAL OIL PRODUCTION, *available at* http//www.dmr nd.gov/oilgas/stats/annualprod.pdf.

2. *Id.*

3. *Id.*

4. DEP'T OF MINERAL RES., N.D. INDUS. COMM'N, 2010 NORTH DAKOTA OIL PRODUCTION BY FORMATION, *available at* http://www.dmr nd.gov/oilgas/stats/2010Formation.pdf.; DEP'T OF MINERAL RES., N.D. INDUS. COMM'N, 2009 NORTH DAKOTA OIL PRODUCTION BY FORMATION, *available at* http://www.dmr nd.gov/oilgas/stats/2009Formation.pdf. The Bakken formation area covers a large part of North Dakota stretching from the western border eastward into Towner County and southward into Grant County, involving all or portions of 27 counties. Lake Sakakawea lies on top of the Bakken formation. N.D. STATE WATER COMM'N, 2009 STATE WATER MANAGEMENT PLAN 26 (2009), *available at* http://www.swc nd.gov/4dlink9/4dcgi/Get ContentPDF/PB-1349/SWMP09Report.pdf.

5. MCF is equivalent to a thousand cubic feet. N.D. PETROLEUM COUNCIL, NORTH DAKOTA OIL & GAS INDUSTRY FACTS & FIGURES 2 (2011), *available at* http://www ndoil.org/image/cache /Facts_and_Figures_2011_-_online.pdf.

6. DEP'T OF MINERAL RES., N.D. INDUS. COMM'N, 2010 NORTH DAKOTA GAS PRODUCTION BY FORMATION, *available at* http://www.dmr nd.gov/oilgas/stats/2010gasprod.pdf; DEP'T OF MINERAL RES., N.D. INDUS. COMM'N, 2009 NORTH DAKOTA GAS PRODUCTION BY FORMATION, *available at* http://www.dmr nd.gov/oilgas/stats/2009gasprod.pdf.

7. *See generally* Robert E. Beck, *Current Water Issues in Oil and Gas Development and Production: Will Water Control What Energy We Have?*, 49 WASHBURN L.J. 423 (2010) (discussing the issues noted *infra* text accompanying nn. 13-17.).

8. N.D. STATE WATER COMM'N, *supra* note 4, at 26.

9. *Id*.

six operating ethanol production plants and four in the proposal stage.[10] According to the North Dakota State Water Commission, these plants use three to six gallons of water per gallon of ethanol produced, so a plant that produces 100 million gallons of ethanol would need 900 to 1850 a.f. of water.[11] Looking just at these figures and contemplating all of the oil and gas development occurring now and foreseen in North Dakota,[12] obviously there will be significant demands on North Dakota's water resources.

The principal concerns around the country have come in the context of (1) tight shale gas production,[13] (2) coalbed methane production,[14] and (3) corn-based ethanol production.[15] These operations began using a lot of water at a time when concern over the adequacy of the water resource already was substantial. The earlier rise of concerns over the water resource were fueled by the "general increase in water demand due to population growth[16] [and] the rising demand for new technology, which happen[ed] to be very water consumptive, and the supply uncertainty arising from global warming."[17] The general issue of availability of water for development of North Dakota's energy resources was discussed in a 1976 article.[18] The purpose of this Article is to survey North Dakota law relating to the water resource as the law applies to oil and gas development, giving an overview of the law and identifying issues that should or may need to be addressed.[19] After a brief discussion of North Dakota water

10. *Id.* at 25.

11. *Id.*

12. *See infra* text accompanying notes 41-42.

13. *See* U.S. DEP'T OF ENERGY, MODERN SHALE GAS DEVELOPMENT IN THE UNITED STATES: A PRIMER 21 (Apr. 2009), *available at* http://www netl.doe.gov/technologies/oil-gas/publications/epreprots/shale_gas_primer_2009.pdf; Nicolle R. Snyder Bagnell, *Eastern Shale Plays—A Game Plan for Success*, 55 ROCKY MTN. MIN. L. INST. 32-1 (2009).

14. *See* W. Org. of Res. Councils v. Bureau of Land Mgmt., 591 F. Supp. 2d 1206, 1208 (D. Wyo. 2008).

15. *See* Andy Aden, *Water Usage for Current and Future Ethanol Production*, SW. HYDROLOGY, Sept./Oct. 2007, at 22, *available at* http://swhydro.arizona.edu/archive/V6_N5/feature4.pdf; *see also* The Nat'l Acad. of Sci., *Water Implications of Biofuels Production in the United States*, REPORT IN BRIEF, Oct. 2007, at 2, *available at* http://dels nas.edu/resources/static-assets/materials-based-on-reports/reports-in-brief/biofuels_brief_final.pdf (indicating only two feedstocks for ethanol: corn with 4.9 billion gallons produced in 2006 and sorghum with less than 100 million gallons produced in 2006).

16. As to North Dakota population growth, see N.D. STATE WATER COMM'N, *supra* note 4, at 21-23.

17. *See* Beck, *supra* note 7, at 424.

18. Henry Loble & C. Bruce Loble, *The Rocky Road to Water for Energy*, 52 N.D. L. REV. 529, 530 (1976). In this article, two Montana attorneys explored the need for water in the context of coal development in the Dakotas, Montana, and Wyoming, and the concern for the water resource as it already existed. *Id.*

19. This article explores law on the books as of 2011 and does not explore any active legislative or regulatory proposals.

resources and its uses or users,[20] the Article will be divided into two major parts, the first of which will review the law relating to the status of water and its acquisition for oil and gas development purposes, and the second of which will review the law relating to protecting the extant water resource during and after oil and gas development.

II. NORTH DAKOTA WATER RESOURCES AND ITS USES AND USERS

The North Dakota State Water Commission figures for 2007 show four major sectors consuming a total of 362,082 a.f. of water: Irrigation, 219,100 a.f.; Rural, 10,563 a.f.; Municipal, 71,570 a.f.; and Industrial/Power, 60,849 a.f. (including oil and gas).[21] Electricity producers used an additional 1,131,153 a.f. nonconsumptively for cooling.[22] The State Water Commission projects growth for all of these sectors by 2020.[23] It has noted that "North Dakota's economy is based primarily on agriculture,[24] manufacturing, tourism, and mining."[25] Recreational and ecosystem use of the water resource is not accounted for in these figures.[26] The omission of the recreation use is reinforced by North Dakota's priority list for water use, which lists recreation last and fails to mention ecosystem services.[27] Yet, recreation use is important to North Dakota as the State Water Commission has noted: "Water-based recreation, available at rivers, lakes, and reservoirs, is extremely important to the state's tourism industry."[28] With this significance, it does have to be taken into account in

20. *See infra* Part II.

21. *See* N.D. STATE WATER COMM'N, *supra* note 4, at 20.

22. *Id.*

23. The Commission projects that by 2020 irrigation will increase from 219,000 a f. to 264,394 a f., rural and municipal from 82,133 a f. to 89,400 a f. (46,800 + 42,600), and industrial power from 60,849 to 148,581 a f. (12,000 + 26,000 + 3,400 + 45 + 50,936 + 56,000). The baseline figures are from 2007. *See* N.D. STATE WATER COMM'N, *supra* note 4 at 20. The 2020 figure for irrigation is at *id.* 27. The 2020 component figures for rural and municipal are at *id.* 24-25. The 2020 component figures for industrial power are at *id.* 25-26.

24. "Agriculture is North Dakota's primary industry." N.D. STATE WATER COMM'N, A REFERENCE GUIDE: WATER IN NORTH DAKOTA 2 (2005), *available at* www.swc nd.gov/4dlink9/4dcgi/GetSubCategoryPDF/136/WaterRefGuide.pdf.

25. *Id*. at 1.

26. N.D. STATE WATER COMM'N, *supra* note 4, at 29. The Commission justifies this on the basis that most of this activity is taking place at dams and reservoirs, so that apart from that, the use is small. *Id.*

27. N.D. CENT. CODE § 61-04-06.1 (2010). Ecosystem services have become an important focus in measuring the value of water resources. Thus, the category deserves specification. *See generally* Robert E. Beck, *Introduction and Background*, 3 WATERS AND WATER RIGHTS § 52.06(a) (2009).

28. REFERENCE GUIDE, *supra* note 24, at 2.

the public trust analysis required of each water allocation decision made in North Dakota.[29]

These resources or resource users, if not in competition for water now, could be in competition for water as growth in the various sectors progresses. Clearly, some tensions exist already and more may develop.[30] Although the State Water Commission has a significant management role, the allocation of the water resource and, therefore, the resolution of any tensions that may develop between potential users,[31] is the direct responsibility of the State Engineer.[32] As noted in the introduction above, both oil and gas development are expanding in North Dakota and will demand more water.

Gas was discovered in North Dakota in 1907 and development began almost immediately.[33] Development has been continuous since then. The development will also continue into the future as "[a]ll of the undiscovered continuous gas resides in the Bakken [formation] with a mean of 1,848 [billion cubic feet of gas], and in coalbed gas with a mean of 882 [billion cubic feet of gas]."[34]

On the other hand, while at least eleven wildcatting wells[35] had been drilled for oil in North Dakota before 1943 with two as early as 1923,[36] apparently none had produced commercially significant oil.[37] It was not until April 4, 1951 that North Dakota began to see oil production.[38] However, North Dakota experimented with regulatory legislation for oil

29. As discussed *infra* text accompanying nn. 116-117, in North Dakota, the public trust doctrine requires a determination of the effect of a proposed water allocation "on the present water supply and future needs of the state."

30. *See infra* text accompanying note 50 (regarding distribution problems), note 51 (regarding Fox Hills Aquifer water level decline), and text accompanying note 52 (regarding difficulty in siting projects needing large quantities of water).

31. *See generally id.* ch. 61-02 (relating to the Water Commission generally). For further discussion, see *infra* text accompanying notes 96-99, 108-111.

32. N.D. CENT. CODE § 61-04-06; *see also id.* §§ 61-02-26 to -27. *See generally id.* ch. 61-03 (relating to the State Engineer).

33. *See* Ray R. Friederich & Maurice E. Garrison, *Legal History of Conservation of Oil and Gas in North Dakota*, 24 N.D. BAR BRIEFS: J. STATE B. ASS'N 175, 175 (1948). Gas development is regulated by the North Dakota Industrial Commission. N.D. CENT. CODE § 38-08-04 (2004). The Commission also applies relevant gas regulations to "carbon dioxide, coal bed methane, helium, [and] nitrogen," and to their respective wells and reservoirs. N.D. ADMIN. CODE 43-02-03-62 (2012).

34. U.S. GEOLOGICAL SURVEY, ASSESSMENT OF UNDISCOVERED OIL AND GAS RESOURCES OF THE WILLISTON BASIN PROVINCE OF NORTH DAKOTA, MONTANA, AND SOUTH DAKOTA (2008).

35. Wildcatting is drilling a well in an unproven area.

36. Friederich & Garrison, *supra* note 33, at 176 n.4, 178.

37. *Id.*

38. *See* N.D. PETROLEUM COUNCIL, *supra* note 5, at 2.

resource development well before the development began,[39] legislation some argue may have been responsible for slowing down exploration and thus delaying development.[40] It is projected North Dakota has 2.1 billion barrels of oil that is developable under current technology, principally in the Bakken formation,[41] but total estimated undiscovered oil with a "mean of 3,645 [million barrels of oil]."[42]

The availability of water in North Dakota for future increases in demand is problematic.[43] As to surface water in North Dakota, around ninety-six percent is in the Missouri River with Lake Sakakawea and Lake Oahe, both on the Missouri River, accounting for ninety-seven percent of available stored water.[44] The river and the two lakes are controlled by the U.S. Army Corps of Engineers.[45] The State Water Commission in 2005 noted, however, "[t]he Missouri River is a virtually untapped resource that presents a unique opportunity for development and use in the state's future," and "North Dakota must establish its right to a fair share of Missouri River water."[46]

As to groundwater, there are two basic types of aquifers in North Dakota. The bedrock aquifer formations located throughout most of North Dakota are highly saline with one of little use, but others, though unsuitable for irrigation, are useable and important for other uses.[47] On the other hand, the glacial drift aquifers found in two-thirds of North Dakota contain less salinity and have some potential for large groundwater supply development.[48] The glacial drift aquifer is only a potential source because local characteristics of aquifers vary and may be unknown.[49] With the better water quality in the Missouri River, its management is of great importance to North Dakota.

While historically there appears to have been ample unappropriated water in North Dakota for North Dakota users, distribution problems have existed and North Dakota has been, and is, engaging in major efforts to deal

39. See Friederich & Garrison, *supra* note 33, at 176-80, for discussion of this early legislation.

40. *Id.* at 177-79.

41. N.D. STATE WATER COMM'N, *supra* note 4, at 26.

42. U.S. GEOLOGICAL SURVEY, *supra* note 34.

43. *See* N.D. STATE WATER COMM'N, *supra* note 4, at 14, 21.

44. *Id.* at 30.

45. *See* ETSI Pipeline Project v. Missouri, 484 U.S. 495, 505-06 (1988).

46. REFERENCE GUIDE, *supra* note 24, at 8.

47. N.D. STATE WATER COMM'N, *supra* note 4, at 30-31.

48. *Id.* at 31.

49. *See* REFERENCE GUIDE, *supra* note 24, at 5.

with those distribution problems.[50] With the exception of the Fox Hills aquifer,[51] it is unclear whether North Dakota is experiencing a general water shortage or how soon such a shortage might occur. "North Dakota's ground and surface water resources are becoming more fully appropriated. Thus, the presence or absence of water has become one of the primary factors in locating industrial plants, or any other developments requiring large amounts of water."[52]

In addition to climate problems and population changes, outside forces have, and will continue to have, a lot to do with what water is available to North Dakota. First, issues will continue to arise in the context of water resources shared with other states. In 2011, the United States Supreme Court decided one aspect of a dispute over interpretation of the Yellowstone River Compact,[53] to which North Dakota is a party.[54] The decision was most favorable to Wyoming and least favorable to Montana and North Dakota.[55] Whether the awarding of extra water from the Yellowstone River

50. *See, e.g.*, N.D. STATE WATER COMM'N, *supra* note 4, at 34-35 (discussing the Southwest Pipeline, the Northwest Area Water Supply, the Red River Valley Water Supply, and the Municipal, Rural and Industrial Water Supply Program Projects). However, the Commission notes that "[t]he state lacks a distribution system to move water from the Missouri River to the northwest and eastern portions of the state for various purposes." REFERENCE GUIDE, *supra* note 24, at 8. The Legislature recognized the shortage in eastern North Dakota as deserving a "critical priority." N.D. CENT. CODE § 61-01-26.1 (2010). Additionally, the Legislature outlined financial support for the water development initiatives. *Id.* § 61-01-26.2.

51. Robert Shaver points out that groundwater mining is occurring in the Fox Hills Aquifer, which generally underlies all of western North Dakota that now faces the oil and gas booms, with "pressure head declines of [one] to [two] feet per year" that is already having a negative impact on flowing water wells in western North Dakota areas. Robert Shaver, Water Appropriation Div., N.D. State Water Comm'n, Water Availability for Oil Well Development in North Dakota and Status of Water Depot Permit Applications (December 13, 2011), *available at* http://www ndoil.org/imate/cache/Bakken_Water_Usage.pdf.

52. N.D. STATE WATER COMM'N, *supra* note 4, at 30. For more water resource information relating to North Dakota, *see generally* REFERENCE GUIDE, *supra* note 24; N.D. STATE WATER COMM'N, *supra* note 4; N.D. STATE WATER COMM'N & OFFICE OF THE STATE ENG'R, STRATEGIC PLAN 2011-2013, *available at* http://www.swc nd.gov/4dlink9/4dcgi/GetSubcategory PDF/43/SratPln20112013.pdf; Shaver, *supra* note 51. Many other useful documents on identifying the water resource in North Dakota are available through the State Water Commission's website. *See* N.D. STATE WATER COMM'N, http://www.swc nd.gov (last visited Feb. 20, 2012).

53. *See generally* Montana v. Wyoming, 131 S. Ct. 1765 (2011). North Dakota was a named defendant in this litigation. *Id.* at 1765.

54. N.D. CENT. CODE § 61-23-01.

55. *Montana*, 131 S. Ct. at 1777. The Supreme Court concluded that both Montana and Wyoming recognized irrigators could improve the efficiency of their systems and retain the water for use on the land for which it was appropriated without violating the law as it related to return flow. *Id.* Montana had sued Wyoming on the basis that Wyoming had allowed pre-1950 irrigators to increase their net water consumption by implementing sprinkler systems which reduced the amount of return flow to the stream resulting in less water reaching Montana. *Id.* at 1769. Article V(A) provided that each State could continue to enjoy the appropriative rights to beneficial uses that existed on January 1, 1950 "in accordance with the laws governing the acquisition and use of water under the doctrine of appropriation." *Id.* at 1771. The Court also

to Wyoming will have any effect on the current withdrawal of 26,575 a.f. for irrigating 17,717 acres of land in North Dakota[56] is unclear. Similar decisions on the remaining aspects of the dispute, if unfavorable to North Dakota, could have an impact though. Disputes also have arisen between downstream states and North Dakota over management of the Missouri River by the U.S. Army Corps of Engineers. A principal dispute has been over recreational use, championed by North Dakota, versus navigation use, championed by Missouri. North Dakota has not fared well in these disputes either[57] with the exception that in 2004 the Corps issued its revised Missouri River management plan to favor endangered species and recreation more than it had in the past.[58] North Dakota appears schizophrenic on the water for recreation issue. When it comes to retaining more Missouri River water in North Dakota for recreational use versus sending that water downstream for Missouri's navigation uses, it appears to be the top priority with the state, but within North Dakota, as noted earlier, it is officially the lowest in priority of all uses.[59] As to protecting recreation through establishing and maintaining minimum stream flow, the State Water Commission suggests that such a move would place "considerable constraints" on competing municipal, industrial, and irrigation uses.[60] To the extent that municipal use represents domestic use, the preference for municipal use is rational, and to the extent agriculture remains number one in the economy of North Dakota, guarding agriculture's water resources remains important. However, the pressure for recognizing minimum stream flow levels will continue.[61]

Issues may also continue to arise in the international context because of water resources North Dakota shares with Canada. North Dakota already has faced challenges from Canada both to the Northwest Area Water Supply Project and to the Devils Lake Project. The State Water Commission commenced construction of the Northwest Area Water Supply

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rejected Montana's argument that beneficial use was defined in the compact to mean consumption could not exceed the quantity consumed January 1, 1950. *Id*. at 1777-79.

56. REFERENCE GUIDE, *supra* note 24, at 7.

57. *See generally* South Dakota v. Ubbelohde, 330 F.3d 1014 (8th Cir. 2003); *In re* Operation of Missouri River Sys. Litig., 320 F. Supp. 2d 873 (D. Minn. 2004), *aff'd* 418 F.3d 915 (8th Cir. 2005), *cert. denied* 547 U.S. 1018 (2006).

58. *See In re* Operation of Missouri Sys. Litig., 421 F.3d 618, 627 (8th Cir. 2005), *cert. denied* 547 U.S. 1097 (2006) (discussing the 2003 Amended BiOp RPA which became a basis for the 2004 Master Manual). *But see* Sandra B. Zellmer, *A New Corps of Discovery for Missouri River Management*, 83 NEB. L. REV. 306, 334-37 (2004) (criticizing changes as inadequate).

59. *See supra* text accompanying notes 26-29.

60. REFERENCE GUIDE, *supra* note 24, at 8.

61. See Robert E. Beck & Owen L. Anderson, *Storage, Reuse, and Preservation*, 1 WATERS AND WATER RIGHTS § 13.05(a) (2009), as to instream flow protection in other prior appropriation states.

Project in 2002, with forty-five miles of pipeline completed as of 2009.[62] Canada challenged the construction of the pipeline in federal district court.[63] Missouri filed an amicus curiae brief also challenging construction of the pipeline.[64] Because federal money was being used in constructing the pipeline, Canada challenged the failure to prepare an Environmental Impact Statement (EIS) as required by federal law.[65] The Bureau of Reclamation, the federal agency involved with the North Dakota project, prepared an Environmental Assessment (EA) and determined that there would be no significant environmental impacts.[66] The Federal District Court for the District of Columbia determined that the EA was inadequate and remanded for additional consideration.[67] Rather than redoing the EA, the Bureau of Reclamation decided to prepare an EIS, which the federal court subsequently found to be inadequate.[68] The Devils Lake Project would drain water from Devils Lake into the Red River.[69]

Other federal supremacy issues with an impact on water resource use may arise under various federal laws such as set-aside programs[70] or the Endangered Species Act.[71] In *United States v. Vesterso,*[72] the Eighth Circuit Court of Appeals upheld the conviction of county water resource district board members for knowingly damaging federal property located within waterfowl production easements. Although in *In re Operation of the Missouri River* System[73] the Eighth Circuit Court of Appeals determined the federal Endangered Species Act applied to management of the Missouri River,[74] the court also determined the federal defendants actions had not to

62. The completed project would run a pipeline from the eastern end of Lake Sakakawea on the Missouri River to communities near the Canadian border. *See* N.D. STATE WATER COMM'N, *supra* note 4, at 61 (map illustrating the scope of the project). As of the litigation in question, the pipeline had been completed from Lake Sakakawea to Minot. *See* N.D. STATE WATER COMM'N & OFFICE OF THE STATE ENG'R., *supra* note 52, at 18.

63. *See* Manitoba v. Norton, 398 F.Supp.2d 41 (D.C.C. 2005). *See also* Manitoba v. Salazar, 691 F.Supp.2d 37 (D.C.C. 2010).

64. Manitoba v. Norton, 2003 WL 25760618 (D.C.C.).

65. The National Environmental Policy Act, 42 U.S.C. §§ 4321-4370(h), requires the preparation of a detailed statement on the environmental impact of proposed "major Federal actions significantly affecting the quality of the human environment." 42 U.S.C. § 4332(c).

66. Manitoba v. Norton, 398 F.Supp.2d 37, 51-52 (D.C.C. 2010).

67. *Id.* at 66.

68. Manitoba v. Salazar, 691 F.Supp.2d 37, 51-52 (D.C.C. 2010).

69. *See* People to Save the Sheyenne River v. North Dakota Department of Health, 744 N.W.2d 748, 749 (N.D. 2008); People to Save the Sheyenne River v. North Dakota Department of Health, 697N.W.2d 319, 323 (N.D. 2005).

70. *See generally* United States v. Vesterso, 828 F.2d 1234 (8th Cir. 1987).

71. *See* Amy K. Kelley, *Constitutional Foundations of Federal Water Law*, 2 WATERS AND WATER RIGHTS § 35.09(c)(3) (2009).

72. *Vesterso*, 828 F.2d 1234, 1244-45 (8th Cir. 1987).

73. 421 F.3d 618 (8th Cir. 2005), *cert. denied* 547 U.S. 1097 (2006).

74. 421 F.3d at 630-31.

date violated the Act.[75] In addition to questions arising under these specific federal statutes, within North Dakota, the issue of tribal water rights remains "open and unsettled" with the State Water Commission noting "[s]tate created rights could be vulnerable to tribal claims."[76]

III. ACQUISITION OF WATER FOR OIL AND GAS DEVELOPMENT

A. WATER NEEDS

Other than for employee consumption and sanitation,[77] what water needs exist for oil and gas development? The direct interrelationship between the water resource and oil and gas development exists[78] in four main areas: (1) production of saltwater as a byproduct of oil production;[79] (2) preparation of drilling mud; (3) water flooding; and (4) hydraulic fracturing,[80] otherwise known as fracing or fracturing. Of these four, three involve the active use of water, whereas the fourth deals with the disposal of unwanted water. The three active uses of water will be discussed in this section.

After the development of the rotary drilling bit in the 1800s, it was discovered that the use of a mixture called drilling mud, first used around 1901 and still used today, would enhance the drilling process substantially.[81] When a well was completed, in addition to gravity, natural energy forces located within an oil producing formation—water and gas—would move oil to the wellbore where it would generally be lifted to the surface by a pump.[82] These energy forces would dissipate over time leaving one half or more of the oil in the formation, so methods of artificially introducing energy forces into the formation to move more of the oil to the wellbore, known as "secondary recovery" operations, were

75. *Id.* at 636, 638.

76. N.D. STATE WATER COMM'N, *supra* note 4, at 58.

77. These uses are not within the scope of this article.

78. This interrelation has led to evaluation of the effect of state water laws on oil and gas development. *See, e.g.*, Eva N. Neufeld, *The Kansas Water Appropriation Statutes and Their Effect Upon the Oil and Gas Industry in Kansas*, 50 J. KAN. B. ASS'N 43, (1981).

79. Producing oil and gas also produces salt water so one of the earliest needs was to dispose of this water. Because salt water could damage water supplies, crops, and other assets, its disposal became a subject of regulation. *See* Hall v. Galey, 271 P. 319, 320 (Kan. 1928). Water may also need to be disposed of before production can begin. As to the content of some groundwaters pumped out to facilitate coal bed methane production or as produced water, *see* N. Plains Res. Council v. Fidelity Exploration & Dev. Co., 325 F.3d 1155, 1157 (9th Cir. 2003) and W. Org. of Res. Councils v. Bureau of Land Mgmt., 591 F.Supp. 2d 1206, 1209-10 (D. Wyo. 2008).

80. This article uses "hydraulic facturing" because that is the term used by the North Dakota legislature. N.D. CENT. CODE § 38-08-25 (2004).

81. Beck, *supra* note 7, at 432 n.87.

82. *See* JOHN S. LOWE, OIL AND GAS LAW IN A NUTSHELL 5-7 (4th ed. 2003).

developed.[83] Water flooding of the formation was introduced as a secondary recovery method sometime not long after 1900 and is still in substantial use today.[84] The third use of water is to fracture the formation to allow gas or oil to pass more readily to the wellbore, apparently first tested in 1947 and first used commercially in 1949.[85] For hydraulic fracturing, water, which today may contain "guar gel, nitrogen or carbon dioxide gases, gelled oil, diesel oil, sodium hydroxide, hydrochloric acid, sulfuric acid, fumeric acid, as well as other additives,"[86] is injected into the formation "thereby widening natural fractures and inducing new ones that are held open by the propping agent after the pressure is released."[87] Today, this use of water has increased substantially and has gained significant notoriety.[88] However, with very limited natural seepage in many of the formations now being developed, the oil and gas supplies could not be tapped economically without fracturing.[89] Thus, the likelihood of continued use of water for fracturing is high. The North Dakota Legislature has approved hydraulic fracturing for use in North Dakota,[90] and the State Water Commission has developed estimates of future water needs for well drilling and fracturing.[91] Specific estimates were not provided for future secondary recovery operations.

B. CAN WATER BE ACQUIRED FOR THESE USES?

North Dakota operates under a prior appropriation regime for allocation of water resource use; that is, first in time is first in right.[92] For

83. *See* Earl A. Brown & Raymond M. Meyers, *Some Legal Aspects of Water Flooding*, 24 TEX. L. REV. 456, 456-58 (1946). *See also* JOHN S. LOWE, OIL AND GAS LAW IN A NUTSHELL 7 (4th ed. 2003).

84. Brown, *supra* note 83 at 456-58.

85. Carl T. Montgomery & Michael B. Smith, *Hydraulic Fracturing: History of an Enduring Technology*, JPT, Dec. 2010, at 26, 26-32 (explaining the history of hydraulic fracturing, originating with the use of nitroglycerin in the 1860s).

86. Beck, *supra* note 7, at 435 (quoting Legal Envtl. Assistance Found. v. EPA, 118 F.3d 1467, 1470 (11th Cir. 1997)).

87. *Legal Envtl. Assistance Found.*, 118 F.3d at 1470.

88. *See* Keith B. Hall, *Regulation of Hydraulic Fracturing Under the Safe Drinking Water Act*, 31 WESTLAW J. ENVTL., Mar. 30, 2011, at 1, 1.

89. *See generally* Michael J. Wozniak & Jamie L. Jost, *Horizontal Drilling: Why It's Much Better to "Lay Down" than to "Stand Up" and What is an "18° Azimuth" Anyway?,* 57 ROCKY MTN. MIN. L. INST. 11-1 (2011) (explaining reasons for using horizontal drilling rather than the traditional vertical drilling and noting that most horizontal wells are drilled "to take advantage of fractured reservoirs."). *Id.* at 11-8 ; Robin Beckwith, *Hydraulic Fracturing: The Fuss, the Facts, the Future*, JPT, Dec. 2010, at 34 (discussing among other factors the economic competition among producers as encouraging fracturing to achieve greater recovery from one well bore).

90. N.D. CENT. CODE § 38-08-25 (2004).

91. *See supra* text accompanying notes 8-9.

92. N.D. CENT. CODE §§ 61-04-01.2, -06.3 (2010).

nondomestic uses, the state requires a permit.[93] The system is administered by the North Dakota State Engineer with guidance from the North Dakota State Water Commission,[94] originally known as the State Water Conservation Commission. The Commission's water resource plans over the years reflect its change in focus.[95]

The North Dakota Constitution provides only that "all flowing streams and natural watercourses" are the "property of the state for mining, irrigating and manufacturing purposes."[96] North Dakota courts have not considered whether the constitutional uses are exclusive and, if not, whether the listed uses are preferred uses.[97] Although the constitutional provision says nothing about prior appropriation and appears limited as to the waters involved, the North Dakota Century Code is much broader, providing both that all waters within specified sources within the state belong to the public and that the waters are subject to being appropriated for beneficial use pursuant to Chapter 61-04 of the Code.[98] "Beneficial use shall be the basis,

93. *Id.* § 61-04-02.

94. The State Engineer is the Secretary and Chief Engineer of the Water Commission and is authorized to execute contracts approved by the Commission. *Id.* §§ 61-02-05, -14.2; *id.* § 61-03-01. For a further discussion of the system, *see infra* text accompanying notes 122-31, 138-48.

95. *See Water Management Plans*, N.D. STATE WATER COMM'N, http://www.swc nd.gov/4dlink9/4dcgi/GetSubCategoryRecord/Reports%20and%20Publications/Water%20Management%20Plans (last visited Feb. 20, 2012) (changing the name of resource plans from "1937 Plan of Water *Conservation*" to "1968 State Water *Development* Plan" to "1992 State Water *Management* Plan") (emphasis added).

96. N.D. CONST. art. XI, § 3. Are "streams and natural watercourses" different things? North Dakota Century Code section 61-01-06 defines "watercourse entitled to the protection of the law" as existing "if there is a sufficient natural and accustomed flow of water to form and maintain a distinct and a defined channel." *See also* Froemke v. Parker, 171 N.W. 284, 287 (N.D. 1919) (stating a "natural drainway" is not a "watercourse"). A watercourse has certain characteristics such as "a definite bed, definite channel, of a permanent source of water supply, either continuous or periodic." *Id.* at 286.

97. Idaho has given some consideration to this issue. *See* Dep't of Parks v. Idaho Dep't of Water Admin., 530 P.2d 924 (Idaho 1974).

98. N.D. CENT. CODE § 61-01-01. The Code specifies that the waters be "from the following sources of water supply" and then divides these waters into four categories. *Id.* § 61-01-01(1)-(4). However, there are actually five categories: (1) Water located on the surface other than diffused surface water; (2) Water located under the surface; (3) Residual water, which is water that results from beneficial use; (4) Water that is artificially drained; and (5) Water located in noncontributing drainage areas as defined in the statute, but excluding "privately owned waters." *Id.* Generally excluded are diffused surface waters. *Id.* § 61-01-01(1). A category termed "privately owned waters" is excluded in the context of noncontributing drainage areas. *Id.* § 61-01-01(4). Prior appropriation as a basis for acquiring a water right to use stream water was recognized during territorial days. *See generally* Sturr v. Beck, 6 Dak. 71 (1888), *aff'd* 133 U.S. 541 (1890). However, for a long time, North Dakota applied riparian reasonable use doctrine as a basis for recognizing rights to use streams, for acquiring rights to use groundwater, and for disposing of wastes into a stream. *See generally* Volkman v. City of Crosby, 120 N.W.2d 18 (N.D. 1963) (applying reasonable use doctrine for use of groundwater); McDonough v. Russell-Miller Milling Co., 165 N.W. 504 (N.D. 1917) (applying reasonable use doctrine for disposal of wastes); Bigelow v. Draper, 69 N.W. 570 (N.D. 1896) (applying reasonable use doctrine for stream use despite N.D. CONST. art. XVII, § 210 [now art. XI, § 3]).

the measure, and the limit of the right to the use of water"[99] with beneficial use defined as "a use of water for a purpose consistent with the best interests of the people of the state."[100]

Although there is no reported North Dakota court case that says production of oil and gas as such is a beneficial use, the State Engineer with the State Water Commission,[101] regulators respectively of the North Dakota water resource, do recognize it as a beneficial use.[102] Furthermore, the North Dakota Legislature has announced a strong policy of fostering oil and gas development,[103] such that it seems clear that use of water in the production of oil and gas would be considered beneficial under the above statutory definition. The only question that might be raised is what quality of water is necessary for the designated use, for if a lesser quality of water would suffice and such water is available, then the use of potable water might not be considered beneficial.[104] The Northern Great Plains Water Consortium suggested at the Western North Dakota Water Resources Opportunities meeting on December 10, 2009, that "an abundant supply" of non-potable groundwater sources might be treatable so as to make the water useable for fracking.[105] In 2010, the Consortium noted in a Phase 1 report that "water supplies will need to come from a variety of sources. One Opportunity is to upgrade marginal-quality groundwater resources to satisfy a portion of the demand."[106] The report went on to note that the use of non-potable water was being considered in Phase 2 with an evaluation of membrane technology for treating the water to make it suitable for fracking.[107]

Because of the need for, use of, and potential interaction with water in oil and gas development, there are in reality two regulatory authorities relevant to oil and gas development. While the State Engineer and the State Water Commission regulate the water resource, the North Dakota Industrial

99. N.D. CENT. CODE § 61-04-01.2.

100. *Id.* § 61-04-01.1(1); *see also id.* § 61-01-26(2) ("Well-being of all of the people of the state shall be the overriding determinant in considering the best use, or combination of uses, of water and related land resources.").

101. N.D. CENT. CODE § 38-08-02(2) (2004).

102. *See* N.D. STATE WATER COMM'N, *supra* note 4, at 26 (recognizing the future water needs for oil development in North Dakota).

103. *Id.* § 38-08-01.

104. This is the law in California. *See* Beck, *supra* note 7, at 453. Other states are following suit. *Id.*

105. Northern Great Plains Water Consortium, Bakken Water Opportunity Assessment, Western North Dakota Water Resources Opportunities Meeting (Dec. 10, 2009) circa p. 13.

106. NORTHERN GREAT PLAINS WATER CONSORTIUM, BAKKEN WATER OPPORTUNITIES ASSESSMENT—PHASE 1, at iv (Apr. 2010).

107. *Id.*

Commission has the authority to regulate specifically named operations and "all other operations for the production of oil or gas,"[108] including some water-related activities such as "[d]isposal of saltwater and oilfield wastes."[109] For preparation of drilling mud, which is used in drilling a well and, therefore, clearly an oil and gas operation, the Industrial Commission regulations require the use of freshwater.[110] The apparent objective is to protect from contamination any potable water source the mud might come into contact with.[111]

C. HOW IS THE WATER ACQUIRED?

There are three main routes to consider for acquiring water for oil and gas development: (1) obtaining a water right to unappropriated water; (2) obtaining an existing water right and, if not previously used for oil and gas development, making any necessary changes so that it can be used for oil and gas development; and (3) obtaining the water from a purveyor of water, which might or might not be a public utility.[112] Perhaps a fourth route exists, obtaining water from an owner of "private water" who is not a purveyor of water.[113] The latter avenue is relatively unlikely, however, as the amount is apt to be very limited, for example, from collecting diffused surface water or from others, such as miners, who build a lake from diffused surface water.[114] Oil and gas developers do not have the power of eminent domain for acquiring water, but they do have the power to access water that they have otherwise acquired.[115] In 1976, the North Dakota Supreme Court ruled that any allocation of water in North Dakota is subject

108. N.D. CENT. CODE § 38-08-04(2)(a).

109. *Id.* § 38-08-04(2)(e).

110. N.D. ADMIN. CODE 43-02-03-21 (2012).

111. *See id.*

112. *See infra* subparts (1), (2), & (3).

113. *See Legal Envtl. Assistance Found*, 118 F.3d at 1470.

114. *See* Coteau Props. Co. v. Oster, 606 N.W.2d 876, 878 (N.D. 2000) (describing how miners were able to create a forty-five acre lake by applying for a permit revision from the North Dakota Public Service Commission).

115. N.D. CENT. CODE § 61-01-04 (2010) (property "necessary for the application of water to beneficial uses"). However, the State Water Commission has authority to condemn "water rights of whatever character." *Id.* § 61-02-22; *see also id.* § 61-02-23. *Compare* Mougey Farms v. Kaspari, 579 N.W.2d 583, 590-91 (N.D. 1998) (concluding that "[i]rrigation of farmland . . . is a beneficial use of water consistent with the best interests of the people of North Dakota, which, we conclude satisfies the 'public use' requirement of [North Dakota Century Code section] 61-01-04" and reversing the dismissal of eminent domain claim), *with* Square Butte Elec. Coop. v. Hilken, 244 N.W.2d 519, 525, 527 (N.D. 1976) (noting the specification of purposes within a statute is not final on whether the use constitutes public use and indicates there must be "a direct and substantial benefit to North Dakota"). Transporting water to the place of use is not dealt with in this article although transport is covered in I.C. regulations. *See* N.D. ADMIN. CODE 43-02-03-30.

to the public trust doctrine.[116] The doctrine requires, at minimum, some planning by the state so there can be a determination of the potential effect of the proposed allocation "on the present water supply and future needs of this state," as is discussed below.[117]

1. *Appropriating Water*

First, there should be unappropriated water remaining in the source.[118] At present, the only North Dakota source that arguably does not contain unappropriated water is the Fox Hills aquifer.[119] To acquire a right to divert unappropriated water for oil and gas development, a permit must be obtained from the State Engineer.[120] The procedure for obtaining the permit is specified in the North Dakota Century Code[121] as are the criteria for approval.[122] Generally, if there are several applications before the State Engineer, the earlier application is considered first.[123] However, the Code provides that if there are "competing applications," a specified order of priority must be adhered to.[124] This limitation could be of some importance to oil and gas developers as "industrial use," which is the relevant category for oil and gas development,[125] is listed fifth in priority after domestic, municipal, livestock, and irrigation uses.[126] The regulations define competing applications as applications "from the same source for different

116. See United Plainsmen Ass'n v. North Dakota Water Conservation Comm'n, 247 N.W.2d 457, 461-63 (N.D. 1976).

117. *Id.* at 462. In particular, *see infra* Part IV.

118. The North Dakota Century Code provides that "[t]he rights of a prior appropriator will not be unduly affected." N.D. CENT. CODE § 61-04-06(1). The State Engineer has authority to "[r]eserve and set aside" water for beneficial use in the future. *Id.* § 61-04-31.

119. *See* Shaver, *supra* note 51. The Commission notes only that "it is the policy of the State Engineer to direct large-scale ground water diversions to other groundwater sources, if feasible, to reduce the rate of water-level decline, and to extend the period of free-flowing conditions." N.D. STATE WATER COMM'N, *supra* note 4, at 30-31.

120. N.D. CENT. CODE § 61-04-02. There are exceptions, but they are not relevant to this article.

121. *Id.* §§ 61-04-03 to -15.

122. *Id.* § 61-04-06.

123. *See* N.D. CENT. CODE § 61-04-06.3 (specifying that the water right will date "from the filing of the application.").

124. *Id.* § 61-04-06.1.

125. Industrial use is defined as "use of water for the furtherance of a commercial enterprise wherever located, including manufacturing, mining, or processing." *Id.* § 61-04-01.1(6).

126. *Id.* § 61-04-06.1. Although fourth in this list of priorities, irrigation received an additional boost in 2005 with the enactment of North Dakota Century Code section 61-01-01.2 promoting use of groundwater for irrigation and the processing of products resulting from irrigation. Arguably this elevates food processing (at least with groundwater) from the industrial category to the irrigation category. *See id.* § 61-04-01.1(6).

uses . . . received by the [S]tate [E]ngineer within ninety days of each other."[127]

2. *Acquiring an Existing Right to Appropriate*

While an existing right to appropriate water in North Dakota can be acquired and transferred to a different use, such a transaction requires the consent of the State Engineer.[128] North Dakota, however, not only has a strong policy against the transfer of water from agriculture,[129] it prohibits transfers other than to superior uses.[130] Thus, not only can appropriated water not be obtained from the four superior users noted above,[131] it cannot be obtained from other industrial users as oil and gas development would be at the same level of use and not a superior level of use.[132] Furthermore, under North Dakota law a change in location of use cannot be granted if other appropriators are relying on return flow from that use.[133]

3. *Acquiring Water from a Purveyor of Water*

North Dakota has a policy that "[s]torage of the maximum water supplies shall be provided wherever and whenever deemed feasible and practicable."[134] However, storage of water does not give a right to the water.[135] So, who can allow the use of stored water? To answer this question one important consideration is how the storage came into being. First, the federal government has constructed major storage facilities not only in North Dakota but elsewhere on the Missouri River, making the River itself subject to regulation for usage by the U.S. Army Corps of Engineers.[136] Clearly, the use of the stored water is subject to Corps control, but what is stored water for this purpose? To what extent does North Dakota have claim to its Missouri River waters, that is, water North Dakota would have had a right to if there were no storage facilities and no

127. N.D. ADMIN. CODE 89-03-01-11 (2012).

128. N.D. CENT. CODE § 61-04-15.

129. *Id.* § 61-01-01.2.

130. *Id.* § 61-04-15.1(3).

131. *See supra* text accompanying note 126.

132. *See supra* text accompanying notes 125 & 126. As N.D. Admin Code 89-03-02-01 explains: "a change in purpose of use may only be granted for a use that has a higher priority than the use from which a change is sought." All industrial uses have priority level five and, therefore, one industrial use would not have a higher priority than another industrial use. *Id.*

133. N.D. ADMIN. CODE 89-03-02-10.

134. N.D. CENT. CODE § 61-01-26(3).

135. N.D. ADMIN. CODE 89-03-01-01.3; *see also* N.D. CENT. CODE § 61-04-17 (requiring owners of storage to deliver "excess" water at reasonable rates to persons entitled to use the water for beneficial purposes).

136. *See* ETSI Pipeline Project v. Missouri, 484 U.S. 495, 517 (1988).

Corps regulations, free of Corps control? Can North Dakota divert those waters for whatever beneficial use it determines? Apparently, aspects of this scenario are at a controversy stage now and await resolution.[137] Access to additional Missouri River water could be important for oil and gas development in North Dakota.

Second, storage facilities may be constructed by the North Dakota State Water Commission,[138] by local governments, or by quasi-public government districts.[139] The State Water Commission has power to "sell, lease, and otherwise distribute all waters" that have been developed by the Commission "for any . . . private or public use."[140] The North Dakota statutes contain authority for the Commission to acquire water rights and to deal with the water,[141] identifying how it acquires the rights,[142] when its control over the water begins,[143] and the scope of that control.[144] This authority is to "be construed liberally to effect the purposes thereof."[145] While the Commission has developed several water transportation projects,[146] the authority to sell water to anyone may not apply to those projects.[147] For example, the Southwest Water Authority has the power itself to contract for water with the United States or the State Water Commission and sell that water to users.[148] Similarly, water districts have authority to sell water to users, including users outside district

137. *See* Lauren Donovan, *Corps of Engineers' Water Plan Illegal, State Says*, BISMARCK TRIB., Feb. 1, 2011, http://bismarcktribune.com/news/state-and-regional/article_dc967b92-2e55-11e0-ae94-001cc4c03286 html.

138. N.D. CENT. CODE § 61-02-14(1)(k), (4).

139. *Id.* § 61-02-24.1. This section is expansive in its list of entities that can develop water projects, including "[a]ll political subdivisions, including counties, townships, cities, park districts, and water resource districts." *Id. See generally id.* ch. 61-16.1 (explaining the operation of water resource districts). Although not listed here, water districts also can do so. *See generally id.* § 61-35-12 (providing the list of district board powers).

140. *Id.* § 61-02-14(4).

141. *Id.* § 61-02-28; *see also id.* § 61-02-32 (explaining release of water rights).

142. *Id.* § 61-02-30.

143. *See id.* § 61-02-29.

144. *Id.* § 61-02-35.

145. *Id.* § 61-02-73.

146. *See* N.D. STATE WATER COMM'N, *supra* note 4, at 34-35 (discussing developing projects).

147. Generally the projects are designed to serve only particular geographic areas and communities within those areas, such as the authorization of the Red River Valley Water Supply Project to provide reliable sources "of water of sufficient quantity and quality to supply homes, businesses, industries, wildlife, and recreation in the Red River valley within this state." N.D. CENT. CODE § 61-24.7-01(1). However, a particular project authorization may provide for additional service authority such as in the southwest pipeline project, where a provision expressly authorizes service to "areas in Dunn County, Mercer County, and Oliver County." N.D. CENT. CODE § 61-24.3-21.

148. N.D. CENT. CODE § 61-24.5-09(9).

boundaries.[149] However, with the possible exception of the federal government, any water being sold or otherwise provided by any of these entities should have been officially appropriated by the selling entity under North Dakota's appropriation system before any such sale "or the entity should have complied with statutorily mandated procedures for developing a storage facility."[150]

Generally, public utilities and municipal water suppliers may be limited to serving designated geographic areas.[151] However, North Dakota law specifically provides that incorporated municipalities or rural water systems can sell "excess water" under specified conditions.[152] With the authority for both municipalities and rural water systems to plan for future needs for the next thirty years,[153] it is likely they will have excess water, but the period of availability for sale may be limited.

IV. PROTECTING THE WATER RESOURCE DURING AND AFTER OIL AND GAS DEVELOPMENT

States generally regulate the oil and gas development process and the use and disposal of the water therein so that neither process activity nor escaping water cause harm to the extant water resource.[154] Furthermore, the oil and gas developer may need to get rid of water other than water that has been acquired for the operation. There are two primary circumstances where the latter occurs. First, a formation may have to be dewatered in advance of production. Thus, the removal of water has been necessary to free up methane in coalbed gas formations.[155] In 2009, the Colorado Supreme Court held that removal and disposal of water for that purpose was a beneficial use of water requiring compliance with Colorado's prior appropriation system to acquire a water right to use the water in that manner.[156] Wyoming, on the other hand, attaches its prior appropriation

149. *Id.* § 61-35-12(15), (17). On the other hand, water resource districts do not have express power to sell water outside their boundaries nor have they expressly been denied that power. *See id.* § 61-16.1-09(20).

150. *See e.g., supra* text accompanying n. 93 (appropriation permit requirement); N.D. CENT. CODE § 61-16.1-38 (requiring permit for water resource district for construction of dam, dike, or other device).

151. *See* Robert E. Beck, *Municipal Water Priorities/Preferences in Times of Scarcity: The Impact of Urban Demand on Natural Resource Industries*, 56 ROCKY MTN. MIN. L. INST. 7-1, 7-22 to -23 (2010).

152. N.D. CENT. CODE §§ 61-04-06.2, 61-02-27; N.D. ADMIN. CODE 89-03-01-01.5 (2012) (including requiring that the sale agreement be terminable by the seller with six months notice).

153. N.D. ADMIN. CODE 89-03-03-04.

154. *See* Beck, *supra* note 7, at 429-33.

155. *See* Vance v. Wolfe, 205 P.3d 1165, 1167 (Colo. 2009).

156. *Id.* at 1173.

system to the water only after it has been removed.[157] North Dakota has not yet faced coalbed methane development.[158] Second, an oil well likely will also produce water.[159] Oil wells in North Dakota can produce a fair amount of water as noted in *Hanson v. Industrial Commission*,[160] where a well producing thirteen barrels of oil per day was producing 165 barrels of water per day.[161]

In response to these circumstances, the North Dakota Industrial Commission has jurisdiction over and authority "[t]o regulate . . . [d]isposal of saltwater and oilfield wastes."[162] It also has authority to require the prevention of "the pollution of freshwater supplies by oil, gas, or saltwater" and to require that records of saltwater production be kept.[163] Thus, it is the oil and gas regulatory agency rather than the water resource use agency or water pollution control agency[164] that regulates oil and gas activity to protect the extant water resource.

While many general provisions of the law help assure that a potable water source does not get polluted,[165] this article focuses only on provisions specifically designed to protect the water resource from harm during oil and gas development. The latter provisions are of two kinds: those that regulate the conduct of oil and gas developers and those that provide remedies for persons who have suffered harm through interference with their use of water or with their water rights. The following discussion focuses first on three regulatory areas: the drilling and completing of the well; production from the well; and status of the well after production ceases (use for secondary recovery or plugging). It focuses second on remedies.[166]

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157. WYO. STAT. ANN. §§ 41-3-903 to -904 (2011) (calling it "by-product water"); *see* William F. West Ranch, L.L.C. v. Tyrrell, 206 P.3d 722, 732-33 (Wyo. 2009) (attacking Wyoming's approach to regulation of CBM produced water).

158. *See* BD. ON EARTH SCIS. & RES. ET AL., MANAGEMENT AND EFFECTS OF COALBED METHANE PRODUCED WATER IN THE UNITED STATES 19 (2010) *available at* http://www nap.edu/penbook.php?record_id=12915&page=19; Ed Murphy, *Lignite Activity Increases in North Dakota*, 28 NDGS NEWSLETTER, no. 2, at 1, 1-3.

159. *See* JOHN S. LOWE, OIL AND GAS LAW IN A NUTSHELL 6 (4th ed. 2003). *See also supra* note 79 & accompanying text.

160. 466 N.W.2d 587 (N.D. 1991).

161. *Hanson*, 466 N.W.2d at 588. The Industrial Commission has authority to regulate oil well operation to require efficient water-oil ratios. N.D. CENT. CODE § 38-08-14(1)(f) (2004). However, the purpose of this authority is to prevent waste of oil, not water pollution control.

162. N.D. CENT. CODE § 38-08-04(2)(e).

163. *Id.* § 38-08-04(1)(c), (i); *see also id.* § 38-12-02(1)(d).

164. In North Dakota that is the State Water Pollution Control Board with the State Department of Health. N.D. CENT. CODE §§ 61-28-03 to -04 (2010).

165. *See, e.g.*, N.D. ADMIN. CODE 43-01-03-49 to -50 (2012) (relating to oil spills and tank cleaning permits, respectively).

166. *See infra* Part IV.A.1; *see infra* Part IV.A.2; *see infra* Part IV.A.3; *see infra,* Part IV.B.

A. REGULATORY PROVISIONS

1. *Well Drilling and Completion*

Specific regulatory provisions deal with drilling mud and saltwater.[167] Drilling mud is a combination of water and chemicals that is, as the name implies, used in drilling a well.[168] Saltwater generally is produced from oil wells.[169] An important focus is on protecting potable water supplies that may be drilled through on the way to the producing formation.

An Industrial Commission regulation requires the use of freshwater in mixing drilling mud which will protect "all freshwater-bearing strata,"[170] leaving room, however, for the Director to approve other methods, as well.[171] In view of the high salinity content of many of North Dakota's aquifers, what does "freshwater" mean? Another regulation requires sealing to prevent migration to other strata of oil, gas, or water during drilling of the well.[172] Oil, gas, and water strata above the producing horizon are to be sealed or separated.[173] Specified waters[174] are to be confined to their present strata and "adequately protected by methods approved by the commission," with special precautions for artesian water.[175] Finally, all water is to be shut off from and kept out of all penetrated oil and gas strata ordinarily by using one of the methods named in the regulation.[176]

The Commission also regulates the reserve pit that is used for drilling mud and drill cuttings with the regulatory objectives being to prevent pollution of land and freshwaters; to confine oil, gas, or water to their native strata; to prevent the location of pits in or near bodies of water or so as to block natural drainage; to require reclamation plan information; and to remove pit water before reclamation.[177] Furthermore, top water in the reserve pit is to be removed and disposed of in an authorized disposal well or used as approved by the Director and reported.[178] Neither drilling mud

167. *See infra* text accompanying nn. 170-182.

168. *See* JOHN S. LOWE, OIL AND GAS LAW IN A NUTSHELL 6 (4th ed. 2003).

169. *Id.* at 6.

170. N.D. ADMIN. CODE 43-02-03-21.

171. *Id.*

172. *Id.* 43-02-03-20.

173. *Id.*

174. *Id.* "All freshwaters and waters of present or probable value for domestic, commercial, or stock purposes." *Id.*

175. *Id.*

176. *See id.*

177. *Id.* 43-02-03-19.

178. *Id.* 43-02-03-19.2.

nor saltwater may be stored in earthen pits or open receptacles[179] with two exceptions. First, such storage may occur in an emergency, but only with the Director's approval.[180] Second, such storage may occur temporarily during well servicing or plugging operations as defined in the regulation.[181] Finally, if any mud or saltwater winds up in any open pit or receptacle used for flaring casinghead gas, the mud or saltwater is to be removed within twenty-four hours of discovery.[182]

As to the threat to potable water supplies from the escape of water used in fracturing, from the water remaining behind, or from improper disposal of the water, the danger depends largely on what chemicals are contained in the fracturing compound, the local geological conditions, and how near fracturing is to the water supply of concern.[183] Although hydraulic fracturing has been going on since the late 1940s with few, or unknown, apparent negative consequences,[184] conditions in North Dakota vary from area to area, and thus, local studies would be imperative if the local conditions are unknown. As with all human endeavors, accidents can happen and not all effects of an action may be known, which explains why some vital water supply sources (for example, sole source aquifers)[185] are not to be subjected to any risk. For other sources, the question would be how great is the risk? In each instance of fracturing, the question as to risk should be asked and an answer developed. If, for example, much of the water in the Dakota aquifer contains, as the State Water Commission says, "relatively high salinity, particularly in the central and western part of the state" and, therefore, "generally is not suitable for most uses,"[186] how much time and money is it reasonable to expend to protect it?

In 2011, North Dakota enacted a fracturing statute that stated in its entirety: "Notwithstanding any other provision of law, the legislative assembly designates hydraulic fracturing, a mechanical method of increasing the permeability of rock to increase the amount of oil and gas

179. *Id.* 43-02-03-19.3.

180. *Id.*

181. *Id.*

182. *Id.*

183. *See* Beck, *supra* note 7, at 426.

184. As to recent studies, see Susan Phillips, *Study Finds Little Evidence of Water Contamination from Fracking*, NPR (Oct. 25, 2011, 5:29 PM), http://stateimpact npr.org/pennsylvania/2011/10/25/study-finds-little-evidence-of-water-contamination-from-fracking; Jack Z. Smith, *UT Study Finds No Direct Link Between Fracking and Groundwater Contamination*, STAR-TELEGRAM (Feb. 16, 2012), http://www.star-telegram.com/2011/11/09/3513778/ut-study-no-direct-link-between html.

185. 42 U.S.C. § 300h-3(e) (2006). The State Water Commission notes that aquifers often are the sole source of water supply for rural North Dakota communities. *See* N.D. STATE WATER COMM'N, *supra* note 4, at 12-13; REFERENCE GUIDE, *supra* note 24, at 6.

186. N.D. STATE WATER COMM'N, *supra* note 4, at 30.

produced from the rock, an acceptable recovery process in this state."[187] What does this statute mean? Does it mean only that no state agency, no local government, and no North Dakota court can ban the use of hydraulic fracturing? Or does it mean, in addition, that hydraulic fracturing cannot be regulated? This article is written from the perspective that the Industrial Commission still has authority to regulate hydraulic fracturing, although it may not be able to ban its use altogether.

Some of the water that is used for hydraulic fracturing will be used up and some will be reused. To the extent that these events occur, the disposal problem is reduced. Thus, the question is, if there is used water left over after use, how can that excess water be disposed of? While the Eleventh Circuit Court of Appeals had ruled, in 1997, that hydraulic fracturing was to be regulated under the federal Safe Drinking Water Act,[188] in 2005, Congress removed fracturing from the purview of that Act except as to the use of diesel fuel as a fracturing agent.[189] Whether there should be additional federal regulation is under review.[190] Apparently, the Environmental Protection Agency is considering the imposition of standards for wastewater disposal from hydraulic fracturing[191]

As to the amount of water needed, considerable progress has been made elsewhere on the recycling of fracturing water, and according to one industry official, one hundred percent recycling is not far off, having effectively achieved it in the Marcellus Shale development.[192] However, one group studying fracturing water in North Dakota has concluded that "widespread recycling will not likely be economically viable."[193] Also, because at least one process for fracturing that does not use water has been developed,[194] that factor now has to enter into the regulatory process.

Wells are to be completed with strings of casing that are "properly cemented at sufficient depths to adequately protect and isolate all formations containing water, oil, or gas, or a combination of these . . . ."

187. N.D. CENT. CODE § 38-08-25 (Supp. 2011).

188. Legal Envtl. Assistance Found. v. EPA, 118 F.3d 1467, 1477-78 (11th Cir. 1997).

189. 42 U.S.C. § 300h(d)(1). EPA expects to issue guidance on the use of diesel fuels "soon". Alan Kovski, *EPA Guidance Coming on Use of Diesel in Hydraulic Fracturing at Oil, Gas Wells*, 42 Envt. Reptr. (BNA) 941 (Apr. 29, 2011).

190. *See* Cliff L. Rothenstein et al., *Battles Over the Federal Policies Regulating Hydraulic Fracturing*, Policy Insight (K&L Gates), Oct. 17, 2011.

191. Ben Geman, *EPA Plans New Water Standards for "Fracking,"* THE HILL'S E2 WIRE (Oct. 20, 2011), http://thehill.com/blogs/e2-wire/e2-wire/188829-epa-plans-water-standards-for-booming-natural-gas-sector.

192. Kovski, *supra* note 189, at 941.

193. NORTHERN GREAT PLAINS WATER CONSORTIUM., *supra* note 106, at iv.

194. *See* Brian Nearing & Anthony Brino, *Cutting Waste in Gas Drilling*, TIMES UNION (Nov. 7, 2011), http://www.timesunion.com/local/article/Cutting-waste-in-gas-drilling-2254667.php.

This language appears to establish performance standards rather than requiring specific acts or methods. This approach, if it stood alone, would make disclosure important so that the agency could judge the "adequacy" of what is proposed. However, these individual regulations when considered with others may not be simply performance standards. Thus, as noted above, specified waters have to be confined to their present strata and "adequately" protected, but the regulation does not leave it at that and instead goes on to provide that the protection is to be "by methods approved by the [Industrial C]ommission."[195]

2. *Well Production*

As to produced saltwater,[196] Industrial Commission regulations impose fencing requirements for pits and ponds containing saltwater[197] and regulations for saltwater handling facilities.[198] The handling facility regulation is based on the general proposition that all saltwater liquids or brines produced are to be "processed, stored, and disposed of without pollution of freshwater supplies."[199] The liquids or brines are not allowed to overflow or pool on the surface or infiltrate the soil.[200] Surface facilities are acceptable if they meet two general criteria. First, they are to be without leaks and constructed of materials that resist the effects of the contents.[201] This criteria is subject to waiver but if not waived, an unusable device is to be removed.[202] Second, for facilities built or rebuilt after July 1, 2000, dikes of specified material and dimensions for capacity are to be built around the facility within thirty days after a well is completed.[203] Facilities built before July 1, 2000 are subject to the discretion of the Director.[204] Solids stored at such a facility are to be minimized,[205] and any saltwater that

195. N.D. ADMIN. CODE 43-02-03-20.

196. *Id.* 43-02-03-47 (requiring produced water calculation and reporting on a monthly basis). Water production records on file with the Commission constitute evidence in hearings and other proceedings unless specifically excluded by the hearing officer. *Id.* 43-02-03-90.2. Because fracturing enhances recovery, it could be argued that 01(2)(b) includes fracturing; however, it is more likely that what was intended here by "enhanced recovery" are the traditional secondary or tertiary recovery methods, such as water flooding. *See supra* text accompanying n. 84.

197. *Id.* 43-02-03-19.1.

198. *See id.* 43-02-03-53 (defining the term in rule 43-02-03-01(44) as: "any container such as a pit, tank, or pool, whether covered or uncovered, used for the handling, storage, disposal of deleterious substances obtained, or used, in connection with the drilling or operation of wells").

199. *Id.* 43-02-03-53(1).

200. *Id.*

201. *Id.* 43-02-03-53(3)(a).

202. *Id.*

203. *Id.* 43-02-03-53(3)(b).

204. *Id.*

205. *Id.* 43-02-03-53(4).

is located outside the facility is to be removed whether inside or outside of the dikes.[206] The Industrial Commission has authority to order remedial action for leaking saltwater or drilling mud and can contract for remedial action and, in some instances, do so without bids.[207]

Since 1982, a specific chapter in the Industrial Commission regulations has governed control of underground injection.[208] The regulation applies to "saltwater liquids and brines."[209] However, other regulations noted in this discussion can also apply "where applicable."[210] While the underground injection regulations do not appear to apply to hydraulic fracturing,[211] much of the information required in a permit application for underground injection[212] would appear useful in regulating hydraulic fracturing. Such a requirement makes sense, since the primary concern with fracturing is potential harm to drinking water and since protection of drinking water is the principal focus of the underground injection regulations.[213] Further, the Industrial Commission has designated special procedures to be followed for specified oil and gas development activities including underground injection.[214] In *Hanson v. Industrial Commission*, the North Dakota Supreme Court upheld the Commission's denial of an application to inject saltwater into a nearby nonproducing well.[215] However, instead of a denial based on protecting a water source, the denial was based on potential impact to another producer's producing well in the formation.[216] Although more expensive, the applicant had an alternative disposal site in a different formation.[217]

3. *After Production*

Oil or gas exploration and production wells may be converted to freshwater wells but only with application to the Industrial Commission for

206. *Id.* 43-02-03-53(3)(b).
207. N.D. CENT. CODE § 38-08-04.4 (2004).
208. N.D. ADMIN. CODE 43-02-03-56; *id.* 43-02-03-73.
209. *Id.* 43-02-03-53(2).
210. *Id.* 43-02-05-01.1.
211. *See id.* 43-02-05-01(2).
212. *Id.* 43-02-05-04(1).
213. They stem from the federal Safe Drinking Water Act. 42 U.S.C. §§ 300f to 300j-26 (2006); *see* N.D. CENT. CODE § 61-28.1-01 (2010). After Congress had disjoined fracturing from the federal Act, Alabama retained its regulations as a part of its water pollution control regulations. *See* Beck, *supra* note 7, at 438 n.155.
214. N.D. ADMIN. CODE 43-02-03-88.1.
215. Hanson v. Indus. Comm'n, 466 N.W.2d 587, 594 (N.D. 1991).
216. *Id*. at 589.
217. *Id.*

approval.[218] However, approval is not needed if the water is to be used for oil and gas development or geophysical exploration, such as a water flooding operation.[219] The regulation specifies the information to be included on the application.[220] Further, the regulation provides that the application must be accompanied by a conditional water permit from the North Dakota State Water Commission.[221] Finally, compliance with special procedures is required.[222]

In pulling casing, it is necessary "to seal off all freshwater and saltwater strata." [223] Consequently, "the space above the casing stub" is to be retained and "left full of fluid with adequate gel strength and specific gravity, cement, or combination thereof" to accomplish the sealing off.[224] Finally, all plugged wells are to "confine permanently all oil, gas, and water in the separate strata originally containing them."[225] This plugging requirement applies as well to core stratigraphic test holes drilled to or below sands containing freshwater.[226]

B. REMEDIES

The regulations imposing restraints or requirements on conduct in oil and gas development and their enforcement are designed to prevent a quantity or quality diminution in the water supply. This article does not explore the methodology to achieve those ends or the adequacy of enforcement. However, a North Dakota statute does provide for some remedies if there is a performance failure.[227]

First, if the domestic, livestock, or irrigation water supply of a person owning an interest in real property within one-half mile of geophysical or seismological activities or within one mile of an oil or gas well site is "disrupted, or diminished in quality or quantity by the drilling operations and a certified water quality and quantity test has been performed . . . within one year preceding the commencement of drilling operations, the . . . [owner] is entitled to recover the cost of making such repairs,

218. N.D. CENT. CODE § 61-01-27.

219. *Id.* ("[E]xcept for purposes related to chapters 38-08 and 38-08.1, no well that has been drilled . . . may be converted to a water well without first obtaining approval . . . .").

220. N.D. ADMIN. CODE 43-02-03-35 (2009).

221. *Id.*

222. *Id.* 43-02-03-88.1.

223. *Id.* 43-02-03-24.

224. *Id.*

225. *Id.* 43-02-03-34.

226. *Id.*

227. N.D. CENT. CODE § 38-11.1-06 (2004). This Code section is organized poorly and, therefore, needs to be read carefully.

alterations, or construction that will ensure delivery . . . of that quality and quantity of water."[228] Second, a person owning "an interest in real property who" gets all or part of his, her, or its "water supply for domestic, agricultural, industrial, or other beneficial use from an underground source has a claim for [damages] relief against a mineral developer" for water supply "disruption or diminution in quality or quantity," if the drilling operations were the proximate cause of such disruption or diminution.[229] The statute establishes prima facie evidence when an action accrues and how much time there is to bring the action.[230] The statute also provides that a landowner has a claim for damages "proximately resulting from natural drainage of waters contaminated by drilling operations" on another tract of land.[231]

The statute makes it important to determine whether a state of facts that might form the basis for a statutory cause of action would also form the basis for a common law action,[232] because the statute prohibits pursuing a statutory cause of action where the "appropriator of water can reasonably acquire the water under the changed conditions" if the changed conditions resulted from "the legal appropriation of water by the mineral developer."[233] However, a common law cause of action is not prohibited. The statutory provision stating that a mineral developer is responsible for all damages to person or property due to lack of ordinary care of the developer or based on nuisance caused by drilling operations is a reiteration of the common law and not the creation of a new statutory cause of action.[234]

V. CONCLUSION

The demand for water will increase in North Dakota. It is not clear yet, however, about the quantity that will actually be used in future oil and gas production in large part due to uncertainties about the recyclability of fracturing water. The state has available substantial data on the water resources of the state, but it acknowledges several shortcomings such as the quantities of water in certain underground areas, the uncertainty as to state versus federal control, and the adequacy of the supply for the increased

228. *Id.*
229. *Id.*
230. *Id.*
231. *Id.*
232. Under the common law of prior appropriation from early on, if water pollution interferes with an appropriative right to water, it can be the basis for a cause of action. *See* Crane v. Winsor, 2 Utah 248, 253 (Utah Terr. 1877).
233. N.D. CENT. CODE § 38-11.1-06.
234. *Id.*

future demands.[235] These uncertainties create a substantial necessity to protect the known and potential supplies from waste or contamination.

North Dakota's statutory and regulatory language as to protection of these water resources during and after oil and gas development operations appears strong. If the state has the will power to enforce the language, it should stand in good stead from the perspective of protecting extant water resources within the state.

235. *See supra* text accompanying nn. 43-52.