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THE ARCTIC NATIONAL WILDLIFE REFUGE, CORRELATIVE RIGHTS, AND SOURDOUGH: NOT JUST FOR BREAD ANYMORE

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This Article highlights the legal questions presented by oil drilling operations conducted in the Sourdough oil field, which is directly adjacent to the Arctic National Wildlife Refuge (ANWR). The author provides background information on the nature of oil deposits and the impact oil has on the State of Alaska in general, discusses the Alaska National Interest Lands Conservation Act as it applies to oil drainage and oil field unitization, and articulates the financial and legal interests of the federal government and the State of Alaska implicated by a decision not to commence drilling operations in ANWR. The Article concludes that there are four possible courses of legal action that could potentially resolve the issues presented by Sourdough drainage: (1) the federal government could sue the State of Alaska to prove drainage and claim federal royalties; (2) the State of Alaska could sue the federal government, claiming the need to unitize the Sourdough field; (3) the State of Alaska could seek a declaratory judgment to secure its rights to the drained oil; or (4) the Secretary of the Interior could lease land in ANWR to preserve the United States' interest in the undeveloped oil.

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I. INTRODUCTION

On the morning of March 13, 1997, BP Exploration, Alaska, Inc. (BP), announced to the world the birth of the Sourdough oil field (Sourdough).[1] BP estimated the field contained approximately 100 million barrels of oil,[2] a discovery Alaska Governor Tony Knowles hailed as "significant."[3] Some geologists believed the Sourdough field could contain as many as 300 million barrels of oil.[4]

Sourdough is unique among the oil fields in Alaska's North Slope region because it lies adjacent to the Arctic National Wildlife Refuge (ANWR).[5] ANWR is owned by the federal government and is currently closed to oil and gas exploration.[6] BP has stated that the Sourdough field, located on land owned by the State of Alaska, extends to the ANWR border.[7] Environmentalists have stated that the exploration site is less than one kilometer from ANWR.[8] Normally, an oil field occurring near a border does not create any issues, but this single oil reservoir may extend across the border into the neighboring closed federal lands.[9] Therefore, oil

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1. Press Release, Gov. Tony Knowles, Knowles Welcomes BP Sourdough Announcement (Mar. 13, 1997), *available at* http://www.gov.state.ak.us/press/pr031397.html [hereinafter *Knowles Press Release*].

2. NORMAN J. HYNE, PH.D, NONTECHNICAL GUIDE TO PETROLEUM GEOLOGY, EXPLORATION, DRILLING AND PRODUCTION 16 (1995) ("The English unit of crude oil measurement is a barrel (bbl) that holds 42 U.S. gallons or 34.97 Imperial gallons.").

3. *Knowles Press Release*, *supra* note 1.

4. Toni Mack, *Damned if He Does, Damned if He Doesn't*, FORBES, July 7, 1997, at 82, *available at* http://www.anwr.org/features/forbes.htm.

5. The North Slope of Alaska, known for its large reserves of oil, refers to the region of the state that dips north from the Brooks Range. Backbone—Standing Up for Alaska's Future, *Information About the Merger*, *at* http://www.alaskabackbone.com/BPRework/02Background2.html (last visited Oct. 22, 2002); s*ee also* CLAUS M. NASKE & HERMAN E. SLOTNICK, ALASKA, A HISTORY OF THE 49TH STATE 8-9 (Univ. of Okla. Press 1987) (1979) (describing the slope region and its proximity to ANWR).

6. 16 U.S.C. § 3143 (2000).

7. Gerald Karey & Rose Ragsdale, *If US Wants Fees from Sourdough, Drilling at ANWR is Possible*, PLATT'S OILGRAM NEWS, Mar. 17, 1997, LEXIS, News Folder, Ponews File.

8. *Alaska Find Sparking Environmental Worry*, CALGARY HERALD, Mar. 14, 1997, at D10.

9. STAFF OF HOUSE COMM. ON NAT. RESOURCES, 105TH CONG., ARCTIC NAT'L WILDLIFE REFUGE (ANWR), http://resourcescommittee.house.gov/ resources/105cong/energy/anwr.htm (last visited Oct. 22, 2002) [hereinafter HOUSE COMM.].

could potentially flow from beneath ANWR to the state land. Although the owner of land overlying an oil field may lease the right to drill for the oil, the owner typically retains a royalty interest in the oil produced.[10] If the Sourdough field does in fact extend into ANWR, oil produced on the state side could pull oil from the federal land—meaning that royalties otherwise belonging to the federal government may go to the State of Alaska.

The Sourdough field thus presents an interesting problem: How can the federal government determine if wells located on state leases drain oil from the adjacent federal land, which is closed to drilling?[11] More importantly, once the government makes such a determination, what legal steps can both the State of Alaska and the federal government take to protect their respective rights in the oil itself, or the royalties derived therefrom? Should Sourdough be developed for the underlying purpose of opening ANWR? At least one Alaskan authority believes that the federal government must drill a well to determine how much oil can be produced from the federal side.[12] Drilling a well would require an act of Congress because a provision in the Alaska National Interest Lands Conservation Act (ANILCA) closed the coastal plain of ANWR to further oil exploration and development.[13] However, notwithstanding the statutory prohibition, former U.S. Secretary of Interior Bruce Babbitt has stated that the Interior Department has the responsibility of ensuring that federal taxpayers are compensated for any federally owned oil that drains to state lands, regardless of the surface development of ANWR.[14]

It remains uncertain whether the Sourdough oil accumulation extends into ANWR, but if it does, production from the state land

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10. *See* HOWARD R. WILLIAMS & CHARLES J. MEYERS, MANUAL OF OIL & GAS TERMS 209 (1991) (defining a "lease") [hereinafter WILLIAMS & MEYERS MANUAL].

11. HOUSE COMM., *supra* note 9 ("How does the federal government determine if the wells produced on State leases drain oil or gas from the adjacent federal land?").

12. Mack, *supra* note 4, at 82 ("To determine recoverable oil, you need information about the rock itself, and that's only available if you drill wells." (quoting David Johnston, former Oil and Gas Conservation Commissioner for the State of Alaska)).

13. 16 U.S.C. § 3143 (2000).

14. *100-Million-Bbl Oil Field Discovered Near Arctic National Wildlife Refuge*, ALASKA REPORT (Petroleum Information/Dwights LLC, Denver, Colo.), Mar. 19, 1997, at 1, 3 [hereinafter *100-Million-Bbl Oil Field*]; Mack, *supra* note 4, at 82; *see infra* Part II.D (explaining the repercussions of drainage from federal lands).

is likely to draw oil from the federal side.[15] In November 2001, the State of Alaska reached an agreement[16] with the lease owners of the Point Thomson Unit (Unit), the oil development area that includes Sourdough.[17] The agreement requires the companies to achieve sustained commercial production from certain areas of the Unit by June 15, 2008,[18] and for Sourdough specifically by June 15, 2010.[19] If Congress does not allow leasing in ANWR for oil and gas production prior to June 15, 2010, thereby allowing the federal government to drill wells of its own, Sourdough is likely to become a factor in the debate that rages over whether ANWR should be opened for oil and gas exploration. If the State develops Sourdough, the issue of oil drainage from federal to state land provides another reason why ANWR should be opened to exploration—to prevent further loss of federal oil and ensuing royalties.

Part II of this Article provides a background into the physical nature of oil, how the ownership of the lands above and adjacent to Sourdough developed, and the impact that oil has on the State of Alaska. The physical properties of oil and the political boundaries near Sourdough are important to understanding the application of modern property law doctrines and why Alaska has a strong interest in seeing Sourdough developed. Part III begins by discussing

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15. Helen Jung, *Test Data Stirs Hopes for Oil Field; Deposit May Reach Underneath ANWR*, ANCHORAGE DAILY NEWS, Mar. 14, 1997, at 1A, LEXIS, News Folder, Anchdn File (stating that petroleum engineer Jack Hartz claims drainage could occur).

16. Yereth Rosen, *Alaska Approves Expansion of Pt Thomson Gas Prospect*, REUTERS, Nov. 13, 2001, *at* http://biz.yahoo.com/rf/011113/n13192490_1.html (last visited Nov. 24, 2001); s*ee also* Letter and Attachment from Mark D. Myers, Dir., Alaska Dep't of Nat. Resources Div. of Oil and Gas, to Bill Strawbridge, Reservoir Evaluation Manager, ExxonMobil Prod. Co. (Aug. 29, 2001), *at* http://www.dog.dnr.state.ak.us/oil/programs/units/pt_expand_approval_082901.pdf (last visited Oct. 22, 2002) (outlining terms of proposed agreement).

17. The majority owners of the Point Thomson Unit leases are ExxonMobil, BP, and Chevron. Kristen Nelson, *State Asks for Production from Point Thomson Unit Next to ANWR by 2008*, PETROLEUM NEWS ALASKA, May 2001, at 1, *available at* http://www.petroleumnewsalaska.com/pnarch/010544.htm (last visited Dec. 26, 2001). For more information on unitization, see *infra* Part III.C.

18. Kristen Nelson, *Exxon's Plan for Point Thomson Brings Field Closer to Development*, PETROLEUM NEWS ALASKA, April 2001, at 1, *available at* http://www.petroleumnewsalaska.com/pnarch/010402.htm (last visited Nov. 24, 2001); *State Conditionally Approves Point Thomson Unit Contract Expansion-Contraction*, PETROLEUM NEWS ALASKA, Aug. 2001, at 1, *available at* http://www.petroleumnewsalaska.com/nbarch/07921.html (last visited Nov. 24, 2001); s*ee also* Rosen, *supra* note 16; Nelson, *supra* note 17, at 1.

19. Nelson, *supra* note 18, at 1.

the application of the "rule of capture," the intent of ANILCA as it applies to oil drainage, and oil field unitization. Part III also discusses the implied executive authority to allow leasing when there is oil drainage from federal land, what is needed to show the existence of oil, and the proof required to show drainage. Part IV explains why ANWR will actually contribute to a reduction of the United States' dependency on foreign oil and how ANWR can be developed with environmental sensitivity. Part V concludes by outlining four possible legal remedies for Sourdough drainage: (1) the federal government could sue the State of Alaska to prove drainage and claim federal royalties; (2) the State of Alaska could sue the federal government, claiming the need to unitize the Sourdough field; (3) the State of Alaska could seek a declaratory judgment to secure its rights to the drained oil; or (4) the Secretary of the Interior could lease land in ANWR to preserve the United States' interest in the undeveloped oil.

II. OIL DYNAMICS, ALASKA'S LAND HISTORY, AND THE ECONOMIC IMPACTS OF OIL

To understand the legal implications underlying Sourdough's development, it is essential to have a basic understanding of the dynamics of oil development and production, the history of the ANWR and the other lands surrounding the Sourdough oil field, and the historical impact of oil development on the State of Alaska.

A. Oil Development and Production

The State of Alaska and the federal government both have an interest in Sourdough: they are the owners of the overlying land. "Correlative rights" is a common law property doctrine that concerns multiple parties' interests in a common source, such as subsurface mineral rights.[20] Typically, the correlative rights doctrine

20. EUGENE KUNTZ, A TREATISE ON THE LAW OF OIL AND GAS § 4.3, at 119 (1st ed. 1987). Kuntz notes that correlative rights is defined by Nev. Rev. Stat. § 522.020(1) as follows:

> [T]he opportunity afforded, so far as it is practicable to do so, to the owner of each property in a pool to produce without waste his just and equitable share of the oil or gas, or both, in the pool; being an amount, so far as can be practically determined, and so far as can practically be obtained without waste, substantially in the proportion that the quantity of recoverable oil or gas, or both, under such property bears to the total recoverable oil or gas, or both, in the pool, and for such purposes to use his just and equitable share of the reservoir energy.

The application of the correlative rights doctrine has been explained as follows:

refers to those rights and duties that exist when landowners have an interest in a common source, which in the context of Sourdough is an oil field.[21] The doctrine of correlative rights includes (1) the right against waste of an extracted substance; (2) the right against spoiling the common source; (3) the right against malicious depletion of the source; (4) the right to a fair opportunity to extract the source; and (5) the right to conduct operations to enhance recovery from the source.[22] Courts have characterized oil and gas in their natural state as fugitive,[23] a term similarly used to describe wildlife and water.[24] This analogy has led courts to erroneous conclusions; oil and gas, at least under natural conditions underground, are essentially static, moving on a geologic scale of time imperceptible to humans.[25]

It is generally accepted that oil develops from the decomposition of animals, mostly marine, that die in concentrated areas, the remains of which are chemically altered over time.[26] Oil and gas deposits are found in sedimentary beds of sandstone, shale, and limestone and are "capped" by a more impervious rock strata.[27] The oil and gas molecules are not pooled in large cavernous enclosures as many people believe; instead, they occupy the interstitial spaces of the rock,[28] which are the microscopic pores within the

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> There appear to be two aspects of the doctrine of correlative rights: (1) as a corollary of the rule of capture, each person has a right to produce oil from his land and capture such oil or gas as may be produced from his well, and (2) a right of the land owner to be protected against damage to a common source of supply and a right to a fair and equitable share of the source of supply.
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> When a legislature or administrative body regulates production practices to protect against waste, it may also regulate to insure equitable distribution of the source of supply. There is some dispute over the power of the state to regulate production practices to insure equitable distribution of the source of supply, apart from waste.

WILLIAMS & MEYERS MANUAL, *supra* note 10, at 257 (citations omitted).

21. KUNTZ, *supra* note 20, § 4.3, at 119.

22. *Id*. at 120 ("[Correlative rights] is a simple doctrine that owners of rights in a common source of supply may not inflict loss upon one another by conduct which is considered to be socially undesirable.").

23. *See, e.g.*, Champlin Refining Co. v. Corp. Comm'n of Okla., 286 U.S. 210, 233 (1932) (describing oil and gas as "fugacious"); *see also* Wm. E. Colby, *The Law of Oil and Gas*, 31 CAL. L. REV. 357, 357 (1943) (explaining the synonyms that courts have used to describe oil and gas in their natural state).

24. Colby, *supra* note 23, at 357.

25. *Id*. at 360.

26. *Id*. at 357.

27. *Id*. at 358 (listing sediments where oil and gas accumulate).

28. *Id*.

rock itself.[29] Oil and gas reservoirs form when hydrocarbons migrate up from their origin rock until they collect in a porous sedimentary deposit (the actual reservoir rock) overlain by a denser mineral, such as shale or salt, which prevents the oil or gas from migrating further.[30] A reservoir is a porous rock that contains commercial, economically recoverable quantities of oil or gas that cannot escape because of surrounding layers of impervious rock.[31]

In many oil fields, water and gas tend to collect in the reservoir as well. Water, which is denser than oil, tends to migrate to the lower portions of the reservoir while still exerting an upward pressure on the oil.[32] Gas, which has either escaped from the oil or migrated from an origin rock, tends to collect at the top of the formation as a "gas cap" and exerts its own downward pressure on the oil.[33] All of the pressures on the oil sum up to a total pressure called "reservoir energy," which is used to aid in the extraction process.[34]

When a well is drilled into the reservoir, these reservoir pressures are released, causing the fluids to migrate underground toward the bottom of the well, where they are brought to the surface.[35] However, oil and gas are left behind when the pressure falls to a point where the total reservoir pressure can no longer force the oil and gas to the surface.[36] In such circumstances, engineers have developed methods to assist in the production of the hydrocarbons.[37] One of these methods involves injecting water into the reservoir to help maintain reservoir pressure and to push the oil toward producing wells.[38] In addition to injecting water into the

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29. Videotape: Arctic Oil . . . Energy for Today and Tomorrow (Video Communications 1995) (on file with author); *see also* RENE COSSÉ, BASICS OF RESERVOIR ENGINEERING 33-34 (1993).

30. San Joaquin Geological Society, *Looking for Oil and Gas?*, *at* http://www.sjgs.com/exploration.html (last updated Sept. 23, 2002); HYNE, *supra* note 2, at 1-2.

31. WILLIAMS & MEYERS MANUAL, *supra* note 10, at 1057.

32. Colby, *supra* note 23, at 359.

33. *Id*. (explaining that while some of the gas under pressure is contained in the oil, it usually migrates to the top of the reservoir).

34. *Id*. at 358.

35. HYNE, *supra* note 2, at 8.

36. *Id.* at 8-9.

37. *Id.* at 9.

38. *See* KUNTZ, *supra* note 20, § 4.8, at 130; *see also* COSSÉ, *supra* note 29, at 211. Cossé notes that:

> [i]n earlier days, it sufficed in a preliminary period (and this still sometimes happens today [in a newly discovered oil or gas field]) to open the wells and to allow the reservoirs to decompress: hence the term ***primary***

formation, gas that is either produced with the oil or imported from another field can also be injected into the reservoir gas cap to assist in maintaining pressure.[39]

Within the larger issue of correlative rights, the production of oil and gas as they flow from their natural state to one of actual possession has an area of property law all to itself. However, oil and gas law and correlative rights law still sit within the larger context of property law, both real property and possessions. Therefore, the ownership history of the lands overlying and surrounding Sourdough is helpful in understanding how these ownerships affect Sourdough's development.

B. History of Alaska's Lands

The Territory of Alaska was organized in 1912 and efforts for its admission as a state began as soon as 1916.[40] There were many

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> ***recovery or natural depletion***. When the reservoir pressure and hence well flow rates become too low, an attempt was sometimes made to attenuate or offset this decompression of the reservoir by the injection of water or gas, called ***secondary recovery***.

Id. (emphasis in original). Cossé goes on to state:

> [r]ecovery by natural drive mechanisms rarely exceeds ***30 to 40%,*** and is often lower for ***oil*** reservoirs. This is why the need soon appeared ***to inject energy into these reservoirs to achieve better recovery***. The first processes employed (injection of water or gas) were employed in a second phase, after decompression of the reservoir, hence the name secondary recovery.

Id. at 261 (emphasis in original).

39. COSSÉ, *supra* note 29, at 211. It is also possible to push oil out from underneath adjacent land using these techniques; however, some jurisdictions have taken the view that this is a compensable tort. *See*, *e.g.*, Young v. Ethyl Corp., 521 F.2d 771, 775 (8th Cir. 1975) (holding forcible displacement of valuable subsurface minerals as an actionable trespass); Greyhound Leasing & Fin. Corp. v. Joiner City Unit, 444 F.2d 439, 445 (10th Cir. 1971) (holding plaintiff entitled to compensation because adjacent leaseholder's water injection flooded plaintiff's oil wells). It has been theorized that Alaska could prevent oil drainage from ANWR using water flood techniques, whereby water would be injected into the Sourdough field along the ANWR border. This would push oil that originated on state land toward producing wells also located on state land. However, water would simultaneously flood into ANWR. *See* Kristen Nelson, *Rule of Capture Prevails*, PETROLEUM NEWS ALASKA, Oct. 22, 2002, at 1, *available at* http://www.anwr.org/features/capture.htm (last visited Sept. 19, 2002). The flooding of water into ANWR as a subsurface trespass, nuisance, or some other tort, is beyond the scope of this Article.

40. Alaska v. United States, 35 Fed. Cl. 685, 687 (1996) (narrating a brief history of Alaska and describing concerns over Alaska's entry into the Union); NASKE & SLOTNICK, *supra* note 5, at 140-41.

obstacles on the road to statehood, not the least of which concerned Alaska's ability to be financially independent.[41] The federal government owned virtually all of Alaska's 365 million acres immediately prior to statehood.[42] Because these federal lands could not be taxed by Alaska after being granted statehood, Congress and many Alaskans feared that Alaska would be unable to carry out the responsibilities of statehood—despite the fact that Alaska was the only government among the 48 states, Hawaii, and Puerto Rico without any debt at the end of 1957.[43] The proposed land grants in the Statehood Act were considered the primary vehicle for freeing Alaska from any future dependence on federal assistance.[44]

After considerable congressional debate concerning the amount of land to allocate to the State, the final proposal limited the State to selecting from land that had not previously been withdrawn[45] by the federal government for other specific purposes, such as national parks and national forests.[46] This represented a significant limitation because the federal government had already withdrawn 95 million of the Territory's 365 million acres for these purposes by 1954.[47] Senator John Marshall Butler of Maryland stated that the federal withdrawals "comprise[] almost all of the best and

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41. *Alaska*, 35 Fed. Cl. at 688; NASKE & SLOTNICK, *supra* note 5, at 146-49 (describing the arguments in the debate over Alaska statehood).

42. *Alaska*, 35 Fed. Cl. at 688; NASKE & SLOTNICK, *supra* note 5, at 158 (stating that the federal government owned 99.8% of Alaska's land mass upon its entry into the Union).

43. *Alaska*, 35 Fed. Cl. at 688 (citing 104 CONG. REC. 12,322 (1958) (reprint of Interior Department report)).

44. *Id*. at 690.

45. The term "withdrawal" has been defined as follows:

> The designation by the executive branch of the federal government of lands not available for settlement, location, sale or entry. Major withdrawals have been made for reclamation projects, power sites, stock driveways, grazing districts and leases, national forests, wildlife refuges, military and naval purposes . . . .
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> Pacific Legal Foundation v. Watt, 529 F. Supp. 982 (D. Mont. 1981), 539 F. Supp. 1194 (D. Mont. 1982), held that the term "withdrawal," as used in the FEDERAL LAND POLICY AND MANAGEMENT ACT OF 1976 . . . includes withdrawal of public lands from mineral exploration and leasing.

WILLIAMS & MEYERS MANUAL, *supra* note 10, at 1372 (citations omitted).

46. *Alaska*, 35 Fed. Cl. at 691 (stating that each proposal for statehood contained a limitation preventing selection of lands withdrawn from public use by the federal government); NASKE & SLOTNICK, *supra* note 5, at 155-57.

47. *Alaska*, 35 Fed. Cl. at 691.

most valuable resources known to exist in the Territory."[48] Of the 95 million acres withdrawn, the largest reservation occurred in 1943 when the Department of the Interior withdrew 67 million acres in three separate areas, including all of the oil-rich North Slope of Alaska, to support the increased need for oil created by World War II.[49] This withdrawal included the area where Sourdough is located and set the stage for Alaska's discovery of oil on the North Slope.

C. History of Oil Development in Alaska

Geologists began exploring the petroleum potential of the North Slope around 1906.[50] The presence of natural oil seeps and oil-stained rock throughout the North Slope region indicated the possibility of discovering subsurface oil reserves.[51] The United States Navy drilled on the North Slope between 1944 and 1953, but found only uneconomic reserves of hydrocarbons.[52] The Secretary of the Interior ultimately released some of this land for mineral leasing, but retained approximately one-third of the land as the Naval Petroleum Reserve No. 4.[53] In Public Land Order 1621, the Secretary formed the Arctic National Wildlife Range (the precursor to the modern day ANWR) on nine million acres, specifying that the Range must remain open to mineral leasing.[54] The Secretary's order additionally provided that the land between the Naval Petroleum Reserve No. 4 and the proposed wildlife range be made available for leases under the Mineral Leasing Act.[55]

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48. *Id*. at 691-92 (citing S. REP. NO. 1929, at 34-35 (1950) (statement of Sen. Butler)).

49. *Id*. at 691 (describing withdrawals made by the Secretary of the Interior).

50. TERRY R. TWYMAN, CRS REPORT FOR CONGRESS, ARCTIC PETROLEUM DEVELOPMENT: IMPLICATIONS OF ADVANCES IN TECHNOLOGY CRS-5 (June 19, 2001) ("Interest in the petroleum potential of the North Slope's coastal plain, 65,000 square miles, or 11% of the land area of the state of Alaska, has been the subject of interest and geologic exploration since about 1906.").

51. *Id*.

52. *Id*. at CRS-5, CRS-6 (explaining how 37 test wells drilled by the Navy between 1944 and 1953 discovered several uneconomic hydrocarbon accumulations); s*ee also* PETROLEUM NEWS ALASKA, KATALLA TO PRUDHOE BAY: AN ENTERTAINING LOOK AT THE OIL & GAS INDUSTRY IN ALASKA 15-16 (Kay Cashman ed., 1997) [hereinafter KATALLA].

53. 42 U.S.C. § 6502 (2000). This area is now known as the National Petroleum Reserve, Alaska (NPRA).

54. Public Land Order 1621, 23 Fed. Reg. 2637 (Apr. 22, 1958) [hereinafter PLO 1621]. For further explanation of the Secretary's order, see Alaska v. United States, 35 Fed. Cl. 685, 691 (1996), *aff'd*, 119 F.3d 16 (Fed. Cir. 1997).

55. PLO 1621, 23 Fed. Reg. 2637; s*ee* Rowe v. United States, 464 F. Supp. 1060, 1064 n.15 (D. Alaska 1979) ("The lands opened to leasing by PLO 1621

The United States admitted Alaska as the forty-ninth state on January 3, 1959.[56] The Alaska Department of Natural Resources, the agency charged with carrying out statehood land selections, hired petroleum geologist Tom Marshall as an assistant land selector that same year.[57] In 1961, Marshall recommended that the State select a 1.5 million acre tract of land on the North Slope, which had been part of the federal land release included in Public Land Order 1621.[58] Oil companies had not been interested in that particular stretch of the Arctic coast when it was under federal control, but its geologic features reminded Marshall of large oil fields in the Rocky Mountains.[59] Many Alaskans criticized Marshall for choosing "a useless frozen wasteland" and dubbed his selection "Marshall's Icebox" because of the industry's previous lack of interest in the area.[60]

In the summer of 1963, two geologists from Richfield Oil Company who were scouting state lands on the North Slope wrote an enthusiastic memo to their supervisor describing the potential for discovery of oil in commercial quantities.[61] BP geophysicists began preliminary seismic work on the North Slope in the same year.[62] In 1964, the State auctioned the first Prudhoe Bay leases.[63]

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were all those lands (except Naval Petroleum Reserve No. 4 and the pending Arctic Wildlife Range) lying north of the crest of the Brooks Range and the DeLong Mountains, from the United States-Canada border to Cape Lisburne and the Arctic Ocean.").

56. Alaska Statehood Act of 1958, Pub. L. No. 85-508, 72 Stat. 339 (codified as amended at 48 U.S.C. § 21 (1994)).

57. Press Release, Univ. of Alaska Fairbanks, Seminar with Geologist Tom Marshall (Oct. 23, 2000), *available at* http://www.uaf.edu/univrel/media/FY01/030ma.html (last modified Oct. 23, 2000) [hereinafter *UAF Press Release*]; KATALLA, *supra* note 52, at 42-43.

58. *UAF Press Release*, *supra* note 57; KATALLA, *supra* note 52, at 42-43.

59. Ned Rozell, *Scientist's Decision Helps Alaska Wallets*, 2000 UNIV. OF ALASKA GEOPHYSICAL INST., ALASKA SCI. F. 1561, *available at* http://www.gi.alaska.edu/ ScienceForum/ASF15/1516.html; KATALLA, *supra* note 52, at 42-43.

60. *UAF Press Release*, *supra* note 57; KATALLA, *supra* note 52, at 42-43.

61. JACK RODERICK, CRUDE DREAMS 138 (1997) ("We have a good selection of excellent reservoir possibilities, and positive proof of the petroliferous nature of these sands. If one cannot get an oil field out of these conditions, I give up.").

62. BP P.L.C., *North to Alaska* (1999), *at* http://www.bp.com/alaska/history/NorthToAlaska.htm (last visited Nov. 24, 2001) (commenting that BP geophysicists had little experience in seismic reflection surveys in permafrost when they started exploration in 1963) [hereinafter *North to Alaska*].

63. BP P.L.C., *The Trail to Prudhoe Bay* (1999), *at* http://www.bp.com/alaska/history/PrudhoeBay.htm (last visited Nov. 24, 2001) [hereinafter *Prudhoe Bay*]. For further information on mineral leasing on federal lands, see GEORGE

In March of 1968, ARCO[64] announced an oil strike at Prudhoe Bay State No. 1, which represented the discovery of the largest oil field in North America.[65]

The State held another lease sale the following year, convening the auction in public and opening the sealed bids before an audience.[66] The State received $900 million from its second round of Prudhoe Bay area leasing,[67] which was the largest windfall in Alaska's history.[68] That sale also marked the point at which Alaska's state budget would become increasingly dependent on oil revenue.

D. Oil's Impact on Alaska

The Alaska Department of Revenue estimates that oil revenue will account for close to 80% of the 2002-2003 fiscal year unrestricted general-purpose revenue, an estimate that is based in part on volatile futures market oil prices.[69] In an affidavit submitted to the Court of Federal Claims, the Director of the State of Alaska's Division of Oil and Gas stated that "[t]he long term stability of Alaska's economy is dependent upon the systematic exploitation of Alaska's oil and gas resources."[70] The need for new oil development is evidenced by the fact that overall production from the North Slope oil fields has declined since 1988.[71] Furthermore, while the Trans-Alaska Pipeline has the capacity to transport more than two million barrels of oil per day, the Alaska Department of Reve-

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CAMERON COGGINS ET AL., FEDERAL PUBLIC LAND AND RESOURCES LAW 570-99 (4th ed. 2001).

64. The Atlantic Refining Company merged with the Richfield Oil Corporation in 1966 to form ARCO. BP P.L.C., *Acquisitions and Mergers Drive Growth* (1866-1969) (2001), *at* http://www.bp.com/company_overview/history/arco/a_mergers.asp (last visited Oct. 22, 2002).

65. *Prudhoe Bay, supra* note 63; s*ee also* KATALLA, *supra* note 52, at 40-41.

66. *Prudhoe Bay*, *supra* note 63; RODERICK *supra* note 61, at 275-81.

67. RODERICK, *supra* note 61, at 275-81.

68. ALASKA DEP'T OF NAT. RESOURCES DIV. OF OIL AND GAS, SUMMARY OF STATE COMPETITIVE LEASE SALES, *available at* http://www.dog.dnr.state.ak.us/oil/products/publications/otherreports/5year99/5year99_summary.html (last revised Feb. 21, 2002) [hereinafter COMPETITIVE LEASE SALES].

69. ALASKA DEP'T OF REVENUE, TAX DIVISION, FALL 2001 REVENUE SOURCES BOOK EXEC. SUMMARY 25-27 (Dec. 7, 2001), *available at* http://www.tax.state.ak.us/SourcesBook/2001FallSources/III.%20Executive%20Summary.pdf.

70. Alaska v. United States, 35 Fed. Cl. 685, 697 (1996).

71. *Id.* at 696.

nue estimates that North Slope crude oil production will be barely half that in the immediate future.[72]

The majority of Alaska's oil revenue comes from state-owned lands, particularly from those located on the North Slope.[73] However, it is estimated that 74% of the recoverable reserves at the "super-giant" Prudhoe Bay field, the largest of the North Slope oil fields, has already been produced.[74] Hence, Alaska has an economic incentive[75] to continue to explore and develop the surrounding smaller oil and gas deposits in order to offset the current overall decline in North Slope production.[76] Sourdough's proposed development will contribute to Alaska's growing thirst for oil-derived income.

E. History of the Arctic National Wildlife Refuge

If Sourdough drains oil and gas from federal land, it will drain them from the coastal plain of ANWR, which is the most promising unexplored oil and gas region in the United States.[77] A 1998 assessment by the United States Geological Survey (USGS) indicates a 95% probability of recovering 4.3 billion barrels of oil from the coastal plain study area and a 5% probability of recovering 11.8 billion barrels.[78] These figures do not include the state and Native-owned lands in the area, which would boost these estimates to 5.7 billion and 16.0 billion barrels, respectively.[79]

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72. ALASKA DEP'T OF REVENUE, *supra* note 69, at 28 ("Future development[s] . . . are projected to keep production slightly above the 1.0 million barrel per day level through FY 2010.").

73. *Alaska*, 35 Fed. Cl. at 696.

74. *Id.*

75. The existence of an economic incentive begs the question of what implications the development of Sourdough may have on other issues, such as national energy policy. For further information on energy policy, see ANNE GILLIS ET AL., CRS INFOPACK, ENERGY POLICY IP447E (2001). *See also* John Benditt, *Special Issue, Energy, Can New Technology Reduce Our Need for Oil from the Middle East?*, TECH. REV., Jan.–Feb. 2002 (discussing emerging energy technologies).

76. For more discussion of oil's impact on Alaska, see Bill McAllister*, Oil and Gas: Alaska's Industry*, JUNEAU EMPIRE ONLINE, Sept. 22, 2002, *at* http://juneauempire.com/anwr/oilandgas.shtml (last visited Oct. 22, 2002).

77. M. LYNNE CORN & BERNARD A. GELB, CRS ISSUE BRIEF, THE ARCTIC NATIONAL WILDLIFE REFUGE: THE NEXT CHAPTER, at CRS-1 (Oct. 1, 2001).

78. UNITED STATES GEOLOGICAL SURVEY, ARCTIC NATIONAL WILDLIFE REFUGE, 1002 AREA, PETROLEUM ASSESSMENT, 1998, INCLUDING ECONOMIC ANALYSIS (April 2001), *available at* http://geology.cr.usgs.gov/pub/fact-sheets/fs-0028-01/fs-0028-01.pdf.

79. *Id.*

ANWR's history is almost as tumultuous as the history of the rest of the state. In 1957, the United States Department of the Interior's Bureau of Sport Fisheries and Wildlife applied to the Interior Department for permission to withdraw 8.9 million acres of land to establish an arctic wildlife refuge.[80] Alaska became a state during the application approval process.[81] On December 6, 1960, the Secretary issued an order placing the Arctic National Wildlife Range under the jurisdiction of the United States Fish and Wildlife Service.[82]

In 1980, Congress passed the Alaska National Interest Lands Conservation Act,[83] which expanded the Arctic National Wildlife Range to include an additional 9.2 million acres, renamed it the Arctic National Wildlife Refuge, and designated much of the original range as "wilderness."[84] Despite this designation, Congress included one very specific directive in ANILCA section 1002.[85] Congress required the Secretary of the Interior to inventory the fish and wildlife resources of the coastal plain and to explore and identify those areas with oil and gas potential.[86] Congress then closed the coastal plain 1002 study area to further exploration or development until passage of a congressional act specifically authorizing leasing.[87]

III. SOURDOUGH'S DEVELOPMENT WARRANTS OPENING ANWR TO OIL PRODUCTION

Section 1003 of ANILCA states that "[p]roduction of oil and gas from ANWR is prohibited and no leasing or other development leading to production of oil and gas from the range shall be undertaken until authorized by an Act of Congress."[88] This statement leaves many questions unanswered. For instance, does the Act's ban on oil production apply to oil drainage from ANWR to adjacent state-owned land? Does section 1003 of the Act trump Alaska's sovereign right to develop its land when there is drainage?

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80. United States v. Alaska, 521 U.S. 1, 46 (1997) (explaining the history of ANWR in the context of a dispute over title to submerged lands).

81. *Id.*

82. *Id.*; 25 Fed. Reg. 12,598 (Dec. 6, 1960).

83. Alaska National Interest Lands Conservation Act (ANILCA), Pub. L. No. 96-487, § 303, 94 Stat. 2390 (1980) (codified at 16 U.S.C. §§ 3101-3233 (2000)).

84. *See id*. A designation of "wilderness" prohibits all road construction, use of motor vehicles, and installation of structures. *Id.* § 1133(c).

85. *Id.* § 3142.

86. *Id.* § 3142(c).

87. *Id.* §§ 3142(h), 3143.

88. *Id.* § 3143.

Does Alaska have any remedy that would allow legal production from ANWR? Does the federal government have any method that would allow it to prove drainage and claim royalties from state-produced oil or gas? A brief examination of common law property doctrine is relevant to answering these questions.

A. The "Rule of Capture" Still Applies

Under the common law of property, land ownership in fee simple[89] carries with it the rights to the minerals located therein.[90] However, the common law takes a different approach to subsurface fluid minerals such as oil and gas. Earlier courts, which did not fully appreciate the complexities of hydrocarbon reservoir geology, characterized these minerals as "fugitive" because of their migratory nature.[91] For example, in *Ohio Oil Co. v. Indiana*,[92] the Court characterized oil and gas as similar to other minerals beneath the earth's surface "except . . . [t]hey have no fixed *situs* under a particular portion of the earth's surface within the area where they obtain. They have the power, as it were, of self-transmission [upon discovery]."[93] Just as the owner of a surface interest cannot claim rights to and follow a hunted animal when it leaves his property, neither may he follow oil or gas when it shifts from beneath his property to that of another.[94] A landowner, although entitled to bore wells for natural gas and oil, has no title to those substances

89. Fee is "[a]n inheritable interest in land constituting maximum legal ownership . . ." and fee simple is "an interest in land . . . that endures until the current holder dies without heirs." BLACK'S LAW DICTIONARY 629-30 (7th ed. 1999).

90. Ohio Oil Co. v. Indiana, 177 U.S. 190, 202 (1900) ("No time need be spent in restating the general common-law rule that the ownership in fee of the surface of the earth carries with it the right to the minerals beneath, and the consequent privilege of mining to extract them.").

91. Lynch v. State Bd. of Equalization, 210 Cal. Rptr. 335, 338 (Cal. Ct. App. 1985); *see also* Colby, *supra* note 23, at 357.

92. 177 U.S. 190 (1900) (holding that the legislature's regulation to prevent waste of natural gas was not a taking).

93. *Id*. at 202-03.

94. *Id.* at 209.

> [T]he owner of land has the exclusive right on his property to reduce the game there found to possession, just as the owner of the soil has the exclusive right to reduce to possession the deposits of natural gas and oil found beneath the surface of his land. The owner of the soil cannot follow game when it passes from his property; so, also, the owner may not follow the natural gas when it shifts from beneath his own to the property of someone else within the gas field.

Id.

until he reduces them to actual possession.[95] Pursuit alone does not give the pursuer an interest in the pursued; the pursuer must take actual possession.[96]

Under this "rule of capture," a landowner may claim the fugitive resources originally located under the land of his neighbor through operations on his own property, but does not own the substance until it has been reduced to actual possession and control.[97] The owner of the drained land has no legal remedy, but may protect his rights by drilling a well of his own in order to capture the same resource.[98] Although a lack of knowledge of oil field geology led to its adoption, the common law rule of capture has not been modified despite the subsequent advancement of scientific knowledge.[99]

Scientific advancement also enabled the drilling of wells where their underground locations deviate from their surface locations. Courts are in agreement that the use of any remote drilling is subsurface trespass when the well penetrates the land owned by another.[100] This holding would extend to the more modern technolo-

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95. *Id.*

96. *See generally* Pierson v. Post, 3 Cai. R. 175 (N.Y. Sup. Ct. 1805) (holding that a fox hunter has no action against a person who interferes with and kills the fox being pursued by the hunter since the hunter did not have actual possession).

97. KUNTZ, *supra* note 20, § 4.1, at 112. Kuntz notes that

> [a]ccording to the law of capture, in general terms, the landowner may capture oil or gas by operations on his land. He owns the substance absolutely once it has been reduced to dominion and control. Before the instant of control, however, the ownership of the substance or the right to capture and control it is subject to the possibility of capture and control by another acting within his own rights as a landowner and producing from a common source of supply.

Id. (citations omitted).

98. *Id.*; *see also* Kelly v. Ohio Oil Co., 49 N.E. 399, 401 (Ohio 1897) (holding that an oil company had lawful right to drain adjacent tract); Barnard v. Monongahela Gas Co., 65 A. 801, 802 (Pa. 1907) (holding that a person may place oil and gas wells anywhere on his property without violating his neighbor's property rights to whatever oil or gas may be under his own land).

99. KUNTZ, *supra* note 20, § 4.1, at 111-13.

100. Alphonzo E. Bell Corp. v. Bell View Oil Syndicate, 76 P.2d 167, 176 (Cal. Dist. Ct. App. 1938) ("[N]o one has a right, by reason of the ownership of a surface location lying above an oil zone, to extend his oil wells without the boundaries of his own surface location, vertically, extended downward so as to trespass upon the premises of adjoining owners . . . ."); *see also* Terre Aux Boeufs Land Co., Inc. v. J. R. Gray Barge Co., 803 So. 2d 86, 95-96 (La. Ct. App. 2001) (citing Gliptis v. Fifteen Oil Co., 16 So. 2d 471, 494 (La. 1943)); Cont'l Res., Inc. v. Farrar Oil Co., 559 N.W.2d 841, 844 (N.D. 1997); Colby, *supra* note 23, at 401 (stating that courts have unanimously held that a subsurface penetration is a trespass).

gies of directional drilling, extended reach wells, horizontal drilling, and designer wells when they cross into another person's land.[101] Subject to zoning regulations such as well-spacing and boundary setbacks, an oil operator may freely and lawfully drain oil from his neighbor's subsurface, so long as he does not physically drill into his neighbor's land in an attempt to capture the resources.[102]

Sourdough's identified portion[103] is situated on state land leased to BP and Chevron.[104] The oil that presently sits beneath the state land can be legally developed, and, under the common law rule of capture, any oil that might migrate from federal land would belong to producers on state leases. According to the lease agreement with BP and Chevron, the State of Alaska will receive a royalty payment of 12.5% from the produced oil.[105] Therefore, based on the lease agreement, Alaska's royalties could derive not only from oil beneath its own land, but also from oil that may have originated in ANWR. Accordingly, Alaska would deprive the federal government of royalties it would have otherwise received if the actual oil drilling had occurred in ANWR under federal lease agreements. If the State uses directional drilling to tap into the oil field on the ANWR side, this may be considered a subsurface trespass absent a valid federal lease for the corresponding ANWR surface area. However, in order to lease the land in ANWR, Congress would have to lift the ban on oil production contained in section 1003 of ANILCA.

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101. *See* TWYMAN, *supra* note 50, at CRS-7, CRS-9.

102. Colby, *supra* note 23, at 402.

103. "Identified portion" refers to the drilled, delineated oil reserve on the state leases as opposed to the portion of the Sourdough reservoir that may or may not lie on the ANWR side.

104. *100-Million-Bbl Oil Field*, *supra* note 14, at 1.

105. *See* COMPETITIVE LEASE SALES, *supra* note 68. The Sourdough wells are located on lease ADL-343112. *See* ALASKA OIL & GAS CONSERVATION COMM'N, ALASKA WELLS WITH EXTENDED CONFIDENTIALITY (2002), *at* http://www.state.ak.us/local/akpages/ADMIN/ogc/ci.htm (last visited Oct. 22, 2002). Leases ADL-343101 through ADL-343113 were part of lease sale number thirty-six. *See* ALASKA DEP'T OF NATURAL RES. DIV. OF OIL & GAS, STATE OF ALASKA COMPETITIVE OIL & GAS LEASE SALES (2001), *at* http://www.dog.dnr.state.ak.us/oil/programs/leaseadmin/magic1.htm ("Although the state usually receives cash from the oil and gas lessees for its royalty share, the state has the option of taking its royalty in-kind and selling it itself [to someone other than the producer]."); Press Release, Alaska Dep't of Natural Res., Solicitation for Offers to Purchase Alaska North Slope Royalty Gas (Dec. 26, 2001), *available at* http://www.dog.dnr.state.ak.us/oil/programs/royalty/rik_sale/press_release_12_26_01_patp.pdf (last visited Oct. 22, 2002).

B. Alaska's Right to Drain Versus Congressional Intent to Protect

In ANILCA, Congress explicitly stated that not only is oil production from ANWR prohibited, but that "no leasing or other development *leading* to production of oil and gas from [ANWR] shall be undertaken until authorized by an Act of Congress."[106] Arguably, Sourdough development encompasses drainage, and hence production, from ANWR. Because of the potential for indirect production of oil and gas from ANWR, Congress's intent in establishing the refuge becomes relevant.

Section 101 of ANILCA states that Congress intended the Act to preserve and provide for scenic landscapes, wildlife habitat, natural ecosystems, and wilderness recreational opportunities.[107] However, ANILCA was also designed to provide adequate opportunities "for the satisfaction of the economic and social needs of the State of Alaska and its people," and Congress found the designation of public lands in ANILCA "to represent a proper balance between the reservation of [federal land] and those public lands necessary and appropriate for more intensive use and disposition."[108] In recognition of that purpose, Congress did not designate all of ANWR wilderness.[109] Section 1002 of ANILCA specifically authorizes exploratory activity within the coastal plain and requires the Secretary of the Interior to analyze impacts of oil and gas exploration, development, and production on wildlife resources.[110]

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106. 16 U.S.C. § 3143 (2000) (emphasis added).

107. *Id.* § 3101(b).

> It is the intent of Congress in this Act to preserve unrivaled scenic and geological values associated with natural landscapes; to provide for the maintenance of sound populations of, and habitat for, wildlife species of inestimable value to the citizens of Alaska and the Nation, including those species dependent on vast relatively undeveloped areas; to preserve in their natural state extensive unaltered arctic tundra, boreal forest, and coastal rainforest ecosystems; to protect the resources related to subsistence needs; to protect and preserve historic and archeological sites, rivers, and lands, and to preserve wilderness resource values and related recreational opportunities including but not limited to hiking, canoeing, fishing, and sport hunting, within large arctic and subarctic wildlands and on freeflowing rivers; to maintain opportunities for scientific research and undisturbed ecosystems.

Id.

108. *Id.* § 3101(d).

109. The fact that the coastal plain is *not* designated wilderness may preclude designation as such, since a wilderness designation might conflict with the "no-more" clause contained in ANILCA. *See id*.

110. *Id.* § 3142.

Senator Frank Murkowski, who favors opening ANWR, lauded Senator Henry M. "Scoop" Jackson's foresight in including the section 1002 study and reporting requirements, stating that "[t]he reason the 1.5 million acres was set aside was to consider the great oil potential in the area."[111] Senator Murkowski's statement coincides with Congress's efforts in ANILCA to balance ecological preservation and federal land reservations with reasonable use and development in non-wilderness areas.[112] Therefore, the wilderness portion of ANWR should be contrasted with the coastal plain, where Congress explicitly *required* exploration.[113] Had Congress desired to ban development on the coastal plain, it would have expanded the wilderness portion instead of ordering a resources survey of the 1002 area.

The ban on coastal plain oil development contemplated in section 1003 of ANILCA[114] was intended to preserve the natural values of the *surface* estate, not the *subterranean* geology. Drainage is a reasonable use in this context because it does not conflict with Congress's intent, as stated in section 101,[115] to preserve wildlife habitat and ecosystems. State lease development, and the ensuing drainage, would have no effect on ANWR's corresponding surface estate. Therefore, Alaska's right to produce oil from state leases is left intact despite ANILCA's ban on surface development of federal land.

C. Efficient Development Requires Unitized Oil Fields

At least one early legal scholar in oil development noted that state legislatures and Congress could protect the collective producers' and owners' rights to produce oil and gas and to prevent waste.[116] Not surprisingly, both Congress and the State of Alaska enacted statutes to prevent waste.[117] Waste prevention statutes are

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> The purpose of this section is to provide for a comprehensive and continuing inventory and assessment of the fish and wildlife resources of the coastal plain of [ANWR], an analysis of the impacts of oil and gas exploration, development, and production, and to authorize exploratory activity within the coastal plain in a manner that avoids significant adverse effects on the fish and wildlife and other resources.

Id. § 3142(a).

111. 141 CONG. REC. 14,238 (May 24, 1995) (statement by Sen. Murkowski).

112. 16 U.S.C. § 3101(d).

113. *Id*. § 3142.

114. *Id*. § 3143.

115. *Id*. § 3101(b).

116. Colby, *supra* note 23, at 363 (discussing Justice White's commentary in *Ohio Oil Co. v. Indiana*, 177 U.S. 190 (1900)).

117. 30 U.S.C. § 226(m) (2000); ALASKA STAT. § 31.05.110 (Michie 2001).

justified because the public as a whole has a sufficient interest in the preservation of these resources.[118] This legislation typically requires parties to "unitize" the oil or gas field.[119] Unit agreements[120] group the subsurface hydrocarbons, giving the leaseholders a percentage interest in the produced oil and gas based on the predevelopment amounts underlying their individual leases.[121] The lease owners then operate the field as one unit, usually selecting one leaseholder as the actual operator. Under unitization, parties share operating expenses and profits based on their ownership percentage, as defined in the agreement.[122] Unitization allows for more efficient development of oil and gas, therefore operating to the benefit of both the lessors and the lessees.[123] Unitization obviates the need for the rule of capture, and thus allows the operator to flood one end of the oil field with water in order to push oil to producing wells elsewhere. Absent unitization, individual leaseholders may attempt to flood fields, independently risking trespass through subsurface water invasion.

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118. Ohio Oil Co. v. Indiana, 177 U.S. 190, 204 (1900) (quoting Hague v. Wheeler, 27 A. 714, 719-20 (Pa. 1893)).

119. *See, e.g.*, ALASKA STAT. § 31.05.110.

120. A unit agreement is a plan for development and/or operation of an oil or gas field that is developed as a single consolidated unit, without regard to the varying ownerships of the overlying lands. Costs and benefits are allocated as defined in the plan. *See* WILLIAMS & MEYERS MANUAL, *supra* note 10, at 1315.

121. *Id.* at 1317. More specifically,

> [unitization is a] term frequently used interchangeably with [pooling,] but more properly used to denominate the joint operation of all or some portion of a producing reservoir as distinguished from pooling, which term is used to describe the bringing together of small tracts sufficient for the granting of a well permit under applicable spacing rules.
>
> Pooling is important in the prevention of drilling unnecessary and uneconomic wells, which will result in physical and economic waste. Unitization is important where there is separate ownership of portions of the rights in a common producing pool in order that it may be made economically feasible to engage in cycling, pressure maintenance or secondary recovery operations and to explore for minerals at considerable depths.
>
> The best results in conservation can be attained only by unitization. Only in this way can appropriate use of reservoir pressures be made and secondary recovery operations utilized at the appropriate early stage in the exploration of the oil deposits.

Id. at 1317-18.

122. *See supra* notes 119-121 and accompanying text.

123. Froholm v. Cox, 934 F.2d 959, 963 (8th Cir. 1991) (noting that although unitization may be contrary to the personal wishes of a particular party, "unitization is for the purpose of more properly developing oil and gas; therefore, the units would naturally operate to the benefit of both the lessee and lessor").

The Mineral Leasing Act of 1920 contemplates unitization by authorizing federal leaseholders to enter into cooperative agreements or unit plans whenever the Secretary of the Interior deems it necessary or advisable to the public interest.[124] Further, the Secretary has the discretion to modify lease agreements in furtherance of the unit plan and may require unitization when a lease is issued.[125] In the Mineral Leasing Act, Congress explicitly stated that unitization is "[f]or the purpose of more properly conserving the natural resources of any oil or gas pool, field, or like area . . . ."[126]

Alaska's unitization statute builds on the federal scheme and further authorizes the Alaska Oil and Gas Conservation Commission[127] (AOGCC) to *force* parties into a unitization agreement if they cannot reach one on their own.[128] The stated mission of the AOGCC, the body charged with regulating the underground operation of Alaska's oil industry, is "to protect the public interest in exploration and development of oil and gas resources, ensuring conservation practices, and maxim[izing] ultimate recovery."[129] Theoretically, this policy against waste could be superceded by either state or federal law explicitly sanctioning waste.[130] If oil reserves are proven to exist in the 1002 area, a law sanctioning waste may be necessary to designate the area as wilderness.

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124. 30 U.S.C. § 226(m) (2000); *see also* Norfolk Energy, Inc. v. Hodel, 898 F.2d 1435, 1438 (9th Cir. 1990).

125. 30 U.S.C. § 226(m).

126. *Id.* (announcing the authority of the Secretary of the Interior to establish, alter, or modify cooperative or unit plans).

127. The Alaska Oil and Gas Conservation Commission is an independent quasi-judicial agency within the executive branch of the state. ALASKA OIL & GAS CONSERVATION COMM'N, COMMISSION HISTORY (2001), *at* http://www.state.ak.us/admin/ogc/history.htm (last visited Oct. 22, 2002).

128. Alaska law stipulates that the AOGCC, "upon proper petition, after notice and hearing, has jurisdiction, power and authority, and it is its duty to make and enforce orders and do the things necessary or proper to carry out the purposes of this section." ALASKA STAT. § 31.05.110(a) (Michie 2001). The Supreme Court of Alaska has formally recognized the Commission's authority. *See* Allen v. Alaska Oil & Gas Conservation Comm'n, 1 P.3d 699, 701-02 (Alaska 2000).

129. ALASKA OIL & GAS CONSERVATION COMM'N, MISSION (2001), *at* http://www.state.ak.us/admin/ogc/homeogc.htm (last visited Oct. 22, 2002); *see also* ALASKA STAT. § 31.05.030 (Michie 2001).

130. *See* Poafpybitty v. Skelly Oil Co., 517 P.2d 432, 435 (Okla. 1973). In a discussion of the earlier Supreme Court case *Poafpybitty v. Skelly Oil Co*., 390 U.S. 365 (1967), the court noted that a "lessee is obligated to prevent the waste of oil and gas and agrees to pay the Indian lessor the full value of all gas wasted, unless the Secretary determines at the request of the lessee that the waste was sanctioned by state and federal law." 517 P.2d at 435.

D. Executive Authority, Drainage, and Reserves

1. *Implied Executive Authority to Lease*. The Mineral Leasing Act of 1920 gives the Secretary of the Interior the discretion to enter into lease agreements when "lands owned by the United States are being drained of oil or gas by wells drilled on adjacent lands."[131] If such drainage occurs, the Secretary "may negotiate agreements whereby the United States . . . shall be compensated for such drainage."[132] The federal government traditionally dealt with oil and gas drainage from its lands by holding a lease sale, thereby allowing the affected leaseholders to enter into a unitization agreement.[133] However, when the federal government withdraws land for a specific purpose, such as was the case for ANWR, the withdrawal is not subject to the leasing provisions of the Mineral Leasing Act.[134]

At least one court believes that a state has a sovereign right to drain from beneath closed federal lands.[135] If so, then it would follow that the federal government has a corresponding obligation to lease its lands for mineral development if it suspects that its resources are being depleted. A 1941 opinion letter by U.S. Attorney General Robert Jackson implies such a duty on the part of the federal government:

> MY DEAR MR. PRESIDENT: I have the honor to confirm the view expressed by me at a recent cabinet meeting that there is implied authority in the Executive branch to take protective measures in cases where lands acquired by the United States for a specific public purpose are found to contain oil which is being drained by adjoining owners—such lands not being subject to the Mineral Leasing Act of February 25, 1920.
>
> It is my opinion that the authority to take the protective action is vested in the department or agency charged with jurisdiction

131. 30 U.S.C. § 226(j) (2000).

132. *Id*.

133. *See, e.g.*, Sun Oil Co. v. United States, 572 F.2d 786, 796 (Ct. Cl. 1978) (noting that the Secretary of the Interior solicited bids for a lease sale after discovering the potential for oil drainage from federal land); McKenna v. Udall, 418 F.2d 1171, 1173 (D.C. Cir. 1969) (involving a case where an agency held a lease sale after determining that oil drainage existed from surplus Army land); KN Energy, Inc., v. Marathon Oil Co., No. CV82-L-564, 1983 WL 1430 at *16 (D. Neb. 1983) (involving a case in which the Bureau of Land Management accepted bids for oil and gas leases when it appeared that production from nearby leases was draining federal land).

134. 16 U.S.C. § 3142(i) (2000).

135. Santa Fe Int'l Corp. v. Watt, 591 F. Supp. 929, 942 (D. Del. 1984).

> over the land involved, and includes the making of any necessary contracts.[136]

Jackson's opinion begs the question: What did the Attorney General mean by the term "protective measures"? Considering the need for oil created by World War II, it seems likely that "protective measures" meant the authority to undertake mineral leasing. Seventeen years later, in *Federal Land Bank of Houston v. United States*,[137] the United States Court of Claims took a similar position, stating that an obligation exists "on the part of the Government to lease for drilling if the facts show that wells on the adjacent land are producing oil and possibly depleting the oil in place and recoverable from the land in question."[138]

Even if the Attorney General's opinion is rendered moot for ANWR under section 1003 of ANILCA, the State of Alaska could force the federal government into a lease sale pursuant to its authority to force unitization,[139] or under federal policy designed to prevent waste. Alaska Senator Frank H. Murkowski recognized that the federal government could be drawn into further consideration of ANWR regardless of congressional action, stating that "there may come a point where the federal government will have a responsibility to federal taxpayers to find out what resources lie under parts of the Arctic coastal plain."[140] Some scholars also suggest that lessees have a duty to seek unitization,[141] which would

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136. 40 Op. Att'y Gen. 41 (1941) (citations omitted).

137. 168 F. Supp. 788, 791 (Ct. Cl. 1958).

138. *Id*.

> [The federal government] must work within the framework of the laws and regulations as are designed to protect the public from executive waste in dealing with the public domain. This does not mean that the Government could stand idly by and permit the oil in place to be depleted. The Government must act as speedily as possible under the circumstances.

Id.

139. The State of Louisiana unsuccessfully brought a claim against the United States on a correlative rights issue based on both Louisiana and federal law. Louisiana *ex rel*. Guste v. United States, 832 F.2d 935 (5th Cir. 1987). However, the claim was dismissed because the record showed no evidence of waste. *Id.* at 943-44. Although the Fifth Circuit declined to recognize a duty on the part of the Secretary of the Interior to require unitization in all cases, the facts underlying that case are distinguishable from those surrounding ANWR. The *Louisiana* case involved an offshore tract and did not involve any closed federal land. *Id.* at 938. The merits of an Alaska-law based suit are beyond the scope of this Article.

140. Karey & Ragsdale, *supra* note 7, at 1 (quoting Sen. Frank Murkowski).

141. *See* George W. Hardy III, *Drainage of Oil and Gas from Adjoining Tracts—A Further Development*, 6 NAT. RESOURCES J. 45, 45-51 (1966). In discussing *Breaux v. Pan American Petroleum Corp*., 163 So. 2d 406 (La. Ct. App.

necessarily require BP and Chevron to lobby Congress to allow ANWR leasing. However, the extent of this duty in the case of ANWR is questionable because ANWR is not available for leasing.

If external pressure forces the federal government into leasing,[142] all pressures are conditioned on oil actually being in place in ANWR and draining to adjacent state land. The issue then becomes how the Secretary of the Interior or the State of Alaska can prove that oil would actually drain from ANWR. Alaska's Oil and Gas Conservation Commissioner, along with the House Committee on Natural Resources, believe that a well must be drilled in order to prove the presence of oil or gas.[143] Drilling a well requires an Act of Congress to override the current ban on production included in ANILCA. However, BP, the operator of Sourdough, insists that the field is not intended for use as a "back-door approach to getting into ANWR."[144]

2. *Proving Drainage*. The next issue is to determine exactly what evidence is required to prove that oil is draining across a political boundary. Contrary to the Commissioner's belief, drainage may be proven without drilling a well. Most of the cases dealing with proof of oil and gas drainage fall into two categories: (1) situations where a lessee avoids paying royalties due to a lessor by draining oil from under the leased land via a well on an adjacent property also controlled by the lessee but with terms more favorable to the lessee; and (2) situations involving neighboring landowners (or their lessees) that seek to drain each other's tracts.

Breaux v. Pan American Petroleum Corp.[145] is an example of the first type of oil and gas drainage case. In *Breaux*, the plaintiff leased land to the defendant, reserving the right to production royalties.[146] The defendant-lessee also owned a leasehold on an adja-

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1964), Hardy states that there is a due diligence standard which would require unitization under the implied covenant to protect the leased premises. Hardy, *supra*, at 45. The lessor might be able to recover damages if the lessee has improvidently failed to secure unitization of the part of the leased premises drained by a nearby well. *Id.* at 46. This failure to unitize reasonably may be considered an essential part of a claim. *Id.* at 50; *see also* HOWARD R. WILLIAMS & CHARLES J. MEYERS, OIL AND GAS LAW § 935 (1991) (discussing the duty of an operator to unitize in the context of leasable or already leased lands) [hereinafter WILLIAMS & MEYERS OIL AND GAS LAW].

142. Such external pressure may include a lawsuit based on waste of a resource or litigation seeking unitization or administrative leasing due to drainage.

143. *See* Mack, *supra* note 4, at 82; HOUSE COMM., *supra* note 9.

144. *100-Million-Bbl Oil Field*, *supra* note 14, at 3.

145. 163 So. 2d 406 (La. Ct. App. 1964).

146. *Id.* at 408.

cent tract of land.[147] The defendant drilled a well on the adjacent land approximately 80 feet from plaintiff's property and extracted considerable amounts of oil.[148] The plaintiff argued that since oil had drained from his land, he was entitled to damages based on the production that could have occurred on his land.[149] The action in *Breaux* was premised on the idea that the defendant-lessee breached an implied covenant to prevent drainage from the lessor's land.[150] The court ultimately dismissed the plaintiffs' petition on grounds of insufficiency because the plaintiffs had failed to allege or prove that the lessee could have successfully produced oil or gas from an offset well, that the drilling of such a well would have been prudent or economically feasible, or that any oil or gas would have been produced from such a well.[151]

The second category of drainage cases usually involves two lessees and two lessors. In *Renner v. Monsanto Chemical Co.*,[152] plaintiff Renner, as lessor, sued his lessee.[153] Defendant-lessee Monsanto had completed a well and was producing oil from Renner's property.[154] Baldwin owned an adjacent tract to the south, which he had leased to Sinclair Oil & Gas Company.[155] Sinclair drilled an offset well to prevent the oil underneath the Baldwin land from draining to the Renner land.[156] Sinclair then drilled a second well, closer to the Renner property line but further to the west.[157] Renner claimed that the second Sinclair well was draining oil from Renner's land, and therefore Monsanto, as Renner's les-

147. *Id.*

148. *Id.*

149. *Id.*

150. *Id.* For a comprehensive discussion on implied covenants to protect from drainage, see WILLIAMS & MYERS OIL AND GAS LAW, *supra* note 141, §§ 821-26.

151. *Breaux*, 163 So. 2d at 417-18.

152. 354 P.2d 326, 329 (Kan. 1960).

153. *Id.*

154. *Id.*

155. *Id.*

156. *Id.* "[An offset well is a] well drilled on one tract of land to prevent the drainage of oil or gas to an adjoining tract of land, on which a well is being drilled or is already in production." WILLIAMS & MEYERS MANUAL, *supra* note 10, at 807.

> [An offset well covenant is a] contractual duty, either expressed or implied in an oil and gas lease, to use due diligence to protect the leasehold from drainage. Also called the protection covenant and the drainage covenant. Where the duty is an implied one, the lessee must drill an offset well on the lease if substantial drainage is taking place and if an ordinary prudent operator would do so under similar circumstances.

Id. at 808.

157. *Renner*, 354 P.2d at 329-30.

see, had a duty to drill an offset well to prevent the drainage.[158] The *Renner* court concluded that drainage was occurring in a substantial amount and that an ordinary, prudent operator would have drilled a well within a reasonable time after the operator on the adjoining land had done so.[159] While neither *Breaux* nor *Renner* is specifically applicable to the circumstances of closed federal land, the evidence used to prove drainage is a useful tool in analyzing how drainage from ANWR might be proved.

In order to prove drainage from ANWR, the federal government must first show through maps, records, or even ordinary witnesses (1) the proximity of the well causing drainage and (2) that the well produces a large amount of oil or gas.[160] However, even if the federal government establishes a required spacing order[161] that theoretically places the well's drainage area within ANWR, the government must further show substantial drainage, which neces-

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158. *Id.* at 331. For a more thorough discussion of traditional drainage rights and duties, see WILLIAMS & MEYERS OIL AND GAS LAW, *supra* note 141, §§ 821-26.

159. *Renner*, 354 P.2d at 335.

160. WILLIAMS & MEYERS OIL AND GAS LAW, *supra* note 141, § 823.1. To illustrate that a test well is unnecessary, Williams and Meyers posit the following hypothetical:

> Plaintiff alleges that a certain well, 150 feet north of his boundary line, is draining him and should be offset. He proves by an ordinary witness, or by maps and records, the location of this well, that it is 150 feet from the plaintiff's land, and that it produces a large amount of oil. Plaintiff has gone part way to establishing the ultimate fact of substantial drainage. He may be able to take a further step without expert assistance by showing that a spacing order of the regulatory commission determines that wells in the field drain a radial area greater than 150 feet. Whether plaintiff can thus avoid reliance on an expert depends upon the admissibility and weight of the commission order for this purpose. The plaintiff still has not proved substantial drainage, however, since he has not shown that there is a mineral under his land to be drained. Almost always this will be a matter of expert opinion, although there may be cases where this fact can be proved by prior admissions of the party opponent or by a well belatedly drilled upon the leasehold.

Id. (citations omitted).

161. Well spacing is further defined as follows:

> The regulation of the number and location of wells over an oil or gas reservoir, as a conservation measure.
>
> It is generally agreed today that increased recovery from a reservoir is not a function of the number of wells drilled. Thus to the extent that more wells are drilled than are necessary for maximum recovery, there is economic waste, since the cost of drilling the unnecessary wells need not have been incurred.

WILLIAMS & MEYERS MANUAL, *supra* note 10, at 1359.

sarily includes proving the presence of oil or gas.[162] Almost always, this will require expert testimony, unless it can be proved by a prior admission of the party opponent, or by actually drilling a well.[163]

A second evidentiary issue arises when the court must decide whether to admit expert testimony concerning reservoir conditions based on data prepared by others, or even whether to admit the underlying data itself.[164] In the Sourdough context, the federal government gathered and prepared the seismic data on the ANWR side,[165] so it is likely that the court could call an expert who prepared and analyzed the data.

The court may not, however, determine the sufficiency of the seismic data as a matter of law. Traditionally, courts have left the determination of the substantiality of seismic data to the appropriate state commission. In *Moncrief v. Wyoming Oil & Gas Conservation Commission*,[166] the court stated:

> Our function is to examine the conflicting evidence to determine whether the commission reasonably based its findings and decision upon all the evidence which was before it. Technical decisions relative to the waste of oil and gas resources, however, are for the commission, as the trier of fact made up of experts in the field, to make and not for this Court to decide.[167]

In *Vogel v. Corporation Commission*,[168] the plaintiffs appealed the decision of a spacing order because they believed that it was based upon wholly questionable seismic information.[169] While the *Vogel* court acknowledged the lack of authority holding that seismic data is insufficient by itself, the court noted that since the case included physical wells, there was no need to reach the issue of the sufficiency of the seismic data.[170] Eugene Kuntz, a prominent oil and gas scholar, has cited *Vogel* for the proposition that there is no fixed standard of substantial evidence to determine the existence of

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162. WILLIAMS & MEYERS OIL AND GAS LAW, *supra* note 141, § 823.1.

163. *Id.*

164. *Id.* § 823.2. The power of eminent domain could also require BP and Chevron to produce to the government the data that they possess from the nearby well. However, this issue is beyond the scope of this Article.

165. *See* UNITED STATES GEOLOGICAL SURVEY, *supra* note 78, at 1.

166. 981 P.2d 913 (Wyo. 1999) (reviewing Commission's decision regarding spacing order based on seismic data).

167. *Id*. at 915-16.

168. 399 P.2d 474 (Okla. 1965).

169. *Id.* at 475.

170. *Id*. at 476; s*ee also* Hester v. Sinclair Oil and Gas Co., 351 P.2d 751, 754-55 (Okla. 1960) (discussing the evidentiary standard for a spacing order); Harkin Southwest Corp. v. Board of Oil, Gas, and Mining, 920 P.2d 1176, 1183 (Utah 1996) (holding that the board applied the correct standard of proof).

an oil or gas deposit.[171] However, Kuntz also cites *Vogel* for the proposition that interpretation of seismic data and geologic conditions is itself sufficient evidence to establish a spacing unit, thereby negating the need to drill a well to locate a common reservoir.[172] Kuntz further notes that "statutes relating to field-wide unitization require that the unit area shall include only so much of a common source of supply that has been defined and determined to be productive of oil and gas by actual drilling operations."[173] Applying this last principle, the Sourdough unit cannot include ANWR until wells are drilled. Still, the courts are reluctant to specify a standard to determine whether oil and gas evidence is substantial,[174] preferring to leave the determination up to the appropriate state oil and gas agency.

3. *Proving Reserves*. To establish drainage, a party must prove oil exists to be drained.[175] The only way to know with certainty that a field contains oil or gas is to drill a well.[176] Federal regulations define "proved reservoirs," in the context of financial accounting and reporting for oil and gas producing activities, as follows:

> (i) Reservoirs are considered proved if economic producibility is supported by either actual production or a conclusive formation test. The area of a reservoir considered proved includes (A) that portion delineated by drilling and defined by gas-oil and/or oil-water contacts, if any, and (B) the immediately adjoining portions not yet drilled, but which can be reasonably judged as economically productive on the basis of available geological and engineering data. In the absence of information on fluid contacts, the lowest known

171. Eugene Kuntz, *Recent Natural Resources Cases*, 5 NAT. RESOURCES J. 213, 213 (1965) ("[T]he court has not been inclined to recognize specific standards to be applied in determining whether or not the evidence in a given case is substantial.").

172. *Id.* at 213-14 ("From the standpoint of its practical impact, the *Vogel* case does much to encourage the practice of establishing drilling units on the sole basis of seismic data."); *see also* Joseph R. Dancy & Victoria A. Dancy, *The Regulation of the Oil and Gas Industry by the Oklahoma Corporation Commission*, 21 TULSA L.J. 613, 633 (1986).

173. Kuntz, *supra* note 171, at 215 (citing OKLA. STAT. ANN. tit. 52, § 287.4 (Supp. 1964)).

174. *See id.* at 213.

175. For a technical discussion on how reservoir sizes are estimated, see COSSÉ, *supra* note 29, at 211-59.

176. HYNE, *supra* note 2, at 5.

> structural occurrence of hydrocarbons controls the lower proved limit of the reservoir . . . .[177]
>
> (iii) Estimates of proved reserves do not include the following: . . . (B) crude oil, natural gas, and natural gas liquids, the recovery of which is in doubt because of uncertainty as to geology, reservoir characteristics, or economic factors; (C) crude oil, natural gas, and natural gas liquids that may occur in undrilled prospects . . . .[178]

Subsection (i)(A) applies to the known Sourdough reservoir because wells drilled in Sourdough establish oil contacts.[179] These exploration wells may even be commercially viable, but they have been granted extended confidentiality by the State,[180] meaning the actual well data is not yet available to the public, and thus the commercial viability of the wells is uncertain. If expert interpretation of geological and engineering data establishes that the underground formation containing the known Sourdough deposits extends into ANWR, then subsection (i)(B) will apply as an adjoining portion not yet drilled. Accordingly, ANWR would not require an exploratory well so long as sufficient seismic data exists to establish ANWR's economic productivity. However, the estimates of proved reserves in subsection (iii) do not include reserves whose recovery is uncertain because of geological characteristics.[181] The government may not be able to overcome the limits of subsection (iii) absent more specific seismic data from the coastal plain. Further, a court hearing a case on whether ANWR contains proved reserves may deny the introduction of seismic evidence altogether if ANWR is considered an undrilled prospect. Productivity thus hinges on expert testimony related to geological and engineering data, specifically, whether the limited existing data sufficiently proves that the Sourdough accumulation extends into ANWR. Absent sufficient data, test wells would be necessary—but such drilling is prohibited by ANILCA's section 1003 ban.[182] If Congress refuses to lift the ban, the question returns to whether the federal government should be allowed to sanction the drainage, ultimately denying federal royalties to the American people and directly conflicting with the public policy against wasting oil and gas.

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177. 17 C.F.R. § 210.4-10(a)(2)(i) (2002).

178. *Id.* § 210.4-10(a)(2)(iii).

179. *See id.* § 210.4-10(a)(2)(i)(A).

180. For a list of wells with extended confidentiality, see ALASKA OIL & GAS CONSERVATION COMM'N, ALASKA WELLS WITH EXTENDED CONFIDENTIALITY (2001), *at* http://www.state.ak.us/local/akpages/ADMIN/ogc/ci.htm (last visited Oct. 22, 2002).

181. 17 C.F.R. § 210.4-10(a)(2)(iii).

182. 16 U.S.C. § 3143 (2000).

While at least one case does use the regulatory definition of proved reserves, it does so in the context of contract law as opposed to determining the existence of a reservoir.[183] Other courts have taken a slightly different approach to the definition of "proved reserves." In *F.T.C. v. Texaco, Inc.*,[184] the Court of Appeals for the District of Columbia used the definition put forward by the American Gas Association (AGA):[185]

> Proved Reserves are the estimated quantity of natural gas which analysis of geologic and engineering data demonstrate with reasonable certainty to be recoverable in the future from known oil and gas reservoirs under existing economic and operating conditions. Reservoirs are considered proved that have demonstrated the ability to produce by either an actual production or conclusive formation test.
>
> The area of a reservoir considered proved is that portion delineated by drilling and defined by gas-oil, gas-water contacts or limited by the structural deformation or lenticularity of the reservoir. In the absence of fluid contacts, the lowest known structural occurrency of hydrocarbons controls the proved limits of the reservoir. The proved area of a reservoir may also include the adjoining portions not delineated by drilling but which can be evaluated as economically productive on the basis of geological and engineering data available at the time the estimate is made. Therefore, the reserves reported should include total proved reserves which may be in either the drilled or the undrilled portions of the field or reservoir.[186]

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183. Gregg v. Am. Quasar Petroleum Co., 840 F. Supp. 1394, 1397 (D. Colo. 1991) (holding that proved reserves, for purposes of employee bonus determination, are properly excluded non-economically recoverable components).

184. 555 F.2d 862 (D.C. Cir. 1977).

185. *Id*. at 866 ("The American Gas Association (AGA), [is] a trade association composed of producers, distributors, and marketers of natural gas, [and] is recognized as one of the principal sources of authoritative statistical data concerning the natural gas industry.").

186. *Id.* at 866, 867 n.2. The court also noted that

> [e]ssentially the concept of proved reserves is bottomed on the presence of enough technical data to ensure reasonably accurate measurement of a known reservoir. Even proved reserves are only estimates, however, and competent evaluators may produce slightly different figures based on different analyses of the geological data. Gas producers may also denominate reserves as "speculative," "possible," "probable," "recoverable," or "ultimately recoverable" indicating the progression of knowledge as a field is developed but there is no accepted use or definition of these terms by the industry. Only proved reserves are consistently defined, and only proved reserves are reported by the AGA.

Id. at 867 n.2 (citations omitted).

This definition is very similar to the regulatory definition used in *Gregg v. American Quasar Petroleum Co*.[187] However, the AGA definition centers on whether the reserves can be produced with reasonable certainty under existing economic and operating conditions.[188] Current estimates of any Sourdough reserves existing on the ANWR side cannot be included in this definition of "proved reserves"; the existing economic and operating conditions required under the definition are not present because ANILCA's ban on exploration precludes production or even conclusive formation tests. While the remaining portions of the AGA definition are nearly identical to the regulatory definition, the AGA test sets a heightened burden to establish a "proved" reserve. Under this more stringent definition, obtaining conclusive well data requires Congress to lift ANILCA's ban on oil exploration.

Other courts have taken different approaches in determining what constitutes a proved reserve. In *Phillips Petroleum Co. v. County of Lane*,[189] the court noted that geothermal interests are very similar to oil and gas interests[190] in that they both concern subsurface minerals valued for their energy-producing capabilities and both employ mining techniques for development.[191] The *Phillips* case involved a tax assessment against the plaintiff's "geothermal interests."[192] The court in *Phillips* held that the plaintiff overwhelmingly proved reserves with evidence consisting of an agreement that included an interest in "proven geothermal steam reserves," along with the fact that there were seventeen completed production wells in place.[193] In *Vestal v. United States*,[194] the Federal District Court for the Western District of Arkansas noted that six successful, but not currently producing, gas wells consisting of

187. *Gregg*, 840 F. Supp. at 1398.

188. *Texaco*, 555 F.2d at 867 n.2.

189. 18 Cal. Rptr. 2d 765 (Cal. Ct. App. 1993).

190. *Id.* at 771.

191. *Id*. ("Each of these resources takes a very long time to form. Each is finite and depletable. None is produced in a 'pure' form, each being produced along with many of the same associated minerals." (quoting Pariani v. State, 164 Cal. Rptr. 683, 691 (Cal. Ct. App. 1980)).

192. *Id.* at 766 ("Aminoil and Phillips filed five successive complaints against the County of Lake . . . seeking partial recovery of property taxes assessed against their 'geothermal interests' during the tax years 1978-1984.").

193. *Id.* at 772, 773 n.11.

194. Nos. CIV.A. ED 71 C-17 & ED 72 C-5, 1973 WL 506, at *1 (W.D. Ark. Feb. 9, 1973).

"Sour Gas," heavy in sulfur derivates, constituted "proven" reserves for commercial production purposes.[195]

Phillips and *Vestal* illustrate that evidence concerning a well is not required to prove drainage if non-well evidence is substantial—substantiality being determined by the appropriate agency. However, well data is generally required to prove reserves.[196] Currently, no reserves are proven in ANWR. Therefore, if existing data does not show substantial evidence of drainage into Alaskan lands, the federal government will need to use a well to establish that drainable reserves exist in ANWR. Of course, proving that oil exists in ANWR via either method does not answer the underlying question: Why should ANWR be developed?

IV. THE CASE FOR DEVELOPING ANWR

In 1970, the United States produced 9.6 million barrels of oil per day.[197] That figure had fallen to 7.1 million barrels per day by 1992 and to 5.8 million barrels per day by 2000.[198] Between 1992 and 2000, imports of crude oil increased from 6 million barrels per day to 8.9 million barrels per day.[199] By 2020, domestic production without ANWR is projected to decrease from its current daily rate of 5.8 million barrels to 5.6 million barrels while daily consumption is projected to rise from 19.7 million barrels to 26.7 million barrels.[200] Only through increases in crude imports has the United States offset increased petroleum consumption and declining domestic production.[201] According to the Bush Administration, this constitutes a growing hazard to the energy security of the United States, which underscores the need to explore ANWR for oil and gas.[202]

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195. *Id.* at *2.

196. *Phillips*, 18 Cal. Rptr. 2d at 771-72.

197. *The Facts About the Arctic National Wildlife Refuge (ANWR) Coastal Plain*, ANWR STATUS REPORT (Arctic Power, Anchorage, AK), Spring 2001, at 2 ("Domestic oil production fell to 5.6 million barrels per day (bpd) in 2000 from a high of 9.6 million bpd in 1970.") [hereinafter ANWR STATUS REPORT].

198. Peter Behr & Eric Pianin, *With Energy Woes, Differing Solutions*, WASH. POST, Apr. 9, 2001, at A3.

199. *Id.*

200. M. LYNNE CORN, CRS REPORT FOR CONGRESS, ARCTIC NATIONAL WILDLIFE REFUGE: BACKGROUND AND ISSUES (June 11, 2002), at CRS-5.

201. ROBERT L. BAMBERGER, CRS ISSUE BRIEF, ENERGY POLICY: SETTING THE STAGE FOR THE CURRENT DEBATE (July 10, 2002), at CRS-8.

202. Behr & Pianin, *supra* note 198, at A3.

Opponents of exploration in ANWR believe that conservation and alternative energy development can make up this difference,[203] but even an increase in corporate average fuel economy (CAFE) standards on new vehicles will not introduce a meaningful fuel savings for more than a decade—the time necessary for these vehicles to be introduced and take foothold in the market.[204] Oil and gas account for 65% of total U.S. energy consumption, and petroleum demand is expected to increase 33% by 2020.[205] Currently, 63% of the petroleum used in the United States is consumed by the nation's transportation infrastructure, which is 98% dependent on oil.[206] "[A]bsent some presently illusive technical 'fix,' there is little that can be done to significantly reduce [U.S. dependence upon imported oil] without incurring great economic hardship and lifestyle compromises."[207] Realistically, weaning America's dependence on oil will take longer than most ANWR drilling opponents would like to believe.

Development of ANWR is not a quick technical fix, but rather a long-term policy initiative to increase domestic production while research continues on viable alternative energy sources. If Congress opened the coastal plain today, actual oil production would take seven to ten years and the supply would likely last longer than

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203. Press Release, The Wilderness Society, America Should Reject Big Oil's Tired Old Tune, Permanently Protect The Arctic National Wildlife Refuge, and Adopt A Sustainable Energy Policy (Sept. 28, 2000), *available at* http://www.wildernesssociety.org/newsroom/arctic_oil_092800.htm (last visited Oct. 22, 2002); *Arctic National Wildlife Refuge, Jobs and the Arctic*, ENVTL. UPDATE (Sierra Club, San Francisco, CA), 2002, *at* http://www.sierraclub.org/wildlands/arctic/jobs.asp (last visited Oct. 22, 2002); Chris Baltimore, *Oil Firms Don't Need Alaska Refuge to Drill - Democrats*, REUTERS, Apr. 18, 2002, *available at* http://www.planetark.org/dailynewsstory.cfm/newsid/15528 (last visited Oct. 22, 2002). *Contra Making the Case for ANWR Development*, FEATURE (Arctic Power, Anchorage, AK), Feb. 2002, *available at* http://www.anwr.org/case.htm (last visited Oct. 22, 2002) [hereinafter *Making the Case*].

> Eighty-eight percent of the energy for America's transportation, industry, government and residential needs comes from oil, gas and coal. No combination of conservation, technology or alternatives can come close to replacing those fossil fuels. It will take years for research, testing, permitting, construction, and distribution systems for replacement alternatives to be realized.

Id.

204. BAMBERGER, *supra* note 201, at CRS-8.

205. ANWR STATUS REPORT, *supra* note 197, at 2.

206. *Id.* at 3.

207. CORN, *supra* note 200, at CRS-8.

twenty-five years.[208] Potential ANWR oil production would mean twenty-five years of fewer imports and as many as 12 billion barrels of oil.[209] The domestic oil supply in ANWR will allow for continued development of other energy sources without introducing an economic burden that Americans are unwilling to accept and without further sacrificing national energy security.

Despite the benefits of developing ANWR, many Americans are unwilling to accept the potential environmental burden associated with development.[210] This perceived burden is largely due to a lack of understanding of environmental stewardship practices occurring on the existing North Slope oil fields and the continuing development of ecologically sensitive oil exploration technology. The trend on the North Slope is toward compact developments, reduction of roads, centralized facilities, reduction of waste, and concentration of exploration during the winter when roads and exploration pads can be built from ice.[211] Proponents argue that ANWR's 1.5 million acre coastal plain can be developed from a 2,000 acre "footprint."[212] Congress has taken that argument seriously; the House version of the energy bill introduced during the 107th Congress includes an explicit 2,000-acre limitation on surface impacts (including any gravel berms, piers, or even airstrips) in ANWR.[213] ANWR's development would impact 0.13% of the 1.5 million acre area.[214] That figure clearly illustrates technological advances that have occurred in the last thirty years since Prudhoe Bay's development, which covers approximately 2.62% of its surface area and is still considered to be the cleanest oil development

208. *Myths of ANWR*, ANWR INFO. BRIEF (Arctic Power, Anchorage, AK), Feb. 2001, at 1 [hereinafter *Myths of ANWR*].

209. *Id*. ("[ANWR oil] can be produced at a maximum rate of 2 million barrels per day (capacity of the trans-Alaska oil pipeline). Therefore, it could last for 25 years, and probably much longer.").

210. Mark Gillespie, *Americans Favor Alternative Energy Methods to Solve Shortages*, SAN DIEGO EARTH TIMES ONLINE, (Dec. 2001), *at* http://www.sdearthtimes.com/et1201/et1201s7.html (last visited Oct. 22, 2002); Will Lester, *Poll: Most Oppose ANWR Drilling*, ANCHORAGE DAILY NEWS, Feb. 2, 2001, *available at* http://152.52.16.166/nation/pstory/0,2974,235504,00.html (last visited Oct. 22, 2002);

211. CORN, *supra* note 200, at CRS-6.

212. *Id.*

213. Securing America's Future Energy Act of 2001, H.R. 4, 107th Cong., § 6507(a)(3) (2001).

214. ANWR STATUS REPORT, *supra* note 197, at 7 ("Development in the 1002 Area would potentially alter about 2,000 of the area's 1.5 million acres. That is less than a quarter of one percent of the 1002 area.").

in the world.[215] Most opponents also ignore the fact that half of a million acres of the coastal plain between the section 1002 area and Canada's three-million-acre Northern Yukon National Park are already designated as wilderness.[216] This half-million-acre arctic coastal plain wilderness area is almost as large as the State of Rhode Island.[217]

The section 1002 coastal plain has been described as the "biological heart of the Arctic" and characterized as the only location north of the Brooks Range supporting wildlife.[218] This is far from the truth. While the section 1002 area is certainly an important ecological location, the coastal plain is nearly uniform in its ecological diversity all the way along the U.S. and Canadian arctic coast.[219] Because of this, impacts of oil development in the Prudhoe Bay region, particularly impacts to the caribou herds, make an excellent analogy to potential development in ANWR.[220]

The population of the Central Arctic caribou herd (CAH), which spends its summers in and around the Prudhoe Bay area, grew from 5,000 to 23,444 between 1975 and 1992.[221] Matthew Cronin, a caribou biologist, estimated that the herd then decreased between 1992 and 1995,[222] but as of 2000 the herd's population was up to 27,128.[223] Cronin noted that

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215. *Id*. at 12; *Making the Case*, *supra* note 203.

216. ANWR STATUS REPORT, *supra* note 197, at 12.

217. State of Rhode Island, Rhode Island Fun Facts (2002), *at* http://www.state.ri.us/kids_page/fun_facts/ri_fun_facts.htm (last visited Oct. 22, 2002). Rhode Island covers 1,214 square miles, *id*., which equals 776,960 acres.

218. ANWR STATUS REPORT, *supra* note 197, at 8.

219. *Id.* ("The coastal plain of ANWR is home to caribou, grizzly bears, polar bears, muskoxen, arctic foxes, shorebirds, eagles, and more. So are the existing North Slope oil fields around Prudhoe Bay.").

220. A full analysis comparing potential impacts in ANWR to present impacts in Prudhoe Bay is beyond the scope of this Article. However, a case study of caribou provides a good example of potential impacts.

221. Matthew A. Cronin et al., *Northern Alaska Oil Fields and Caribou*, 28 WILDLIFE SOC'Y BULL. 919, 920 (2000).

222. *Id.* ("Cronin . . . suggested that the decline in the western range between 1992 and 1995 was probably the result of population processes (i.e. population density effects or immigration or emigration between the eastern and western ranges) and was not related to oil fields. A census conducted in 1997 supported this view." (citing Cronin et al., *Caribou Population Density in the Prudhoe Bay Region of Alaska*, 2 J. WILDLIFE RES. 59, 68 (1997))).

223. *Do the Caribou Really Care?* ANWR INFO. BRIEF (Arctic Power, Anchorage, AK), Feb. 2001 (showing a graph of Caribou herd population changes from 1975 through 2000).

> [t]his rate of growth is comparable to other caribou herds in undeveloped areas. In addition, survey data for 1990-1995 show regular use of habitats in the oil fields and no avoidance of infrastructure. After the calving period in early June, caribou move regularly throughout the oil fields and use gravel pads, roads, and shade provided by building and pipelines for relief from parasitic insects.[224]

That is not to say that development has had no impact on the caribou. Cronin stated that some caribou have been displaced by oil-field infrastructure during the calving season, but "these local level impacts have not resulted in negative population-level effects and the CAH has grown throughout the period of oil-field development at a rate comparable to other herds in undeveloped areas."[225] Cronin concluded that "[p]arturition and recruitment data do not support the hypothesis that oil fields adversely affect caribou productivity."[226]

Much concern has focused on the plight of the Porcupine caribou herd, which calves in the section 1002 area. However, studies by the Alaska Department of Fish and Game from 1982 to 2000 show that in no single year did the entire herd calve in the protected section 1002 area.[227] During that nineteen-year period, the percentage calving in the 1002 area was less than 34% on nine occassions and only exceeded 66% on four occasions.[228] In 1982 and 2000, there were no calves born there at all.[229] The percentage calving reached a high of 92% in 1995, but by 2000 it had fallen to zero percent.[230] Caribou tend to choose their calving based on snow melt and early growth of forage plants.[231] Further, the Porcupine caribou herd is down to 129,000 animals compared to its most recent high of 180,000 in 1989.[232] Caribou populations on the North

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224. Cronin et al., *supra* note 221, at 920 (citations omitted).

225. *Id.* at 921 (citations omitted).

226. *Id.* (citations omitted).

227. Arctic Power, *Draft-Porcupine Caribou Herd (PCH) 1982-2000 Percentage of Cows Calving in the 1002 Area* (Sept. 11, 2000) (citing ALASKA DEP'T OF FISH & GAME, ALASKA DEP'T OF FISH & GAME PORCUPINE CARIBOU HERD CALVING SURVEY REPORTS (July 31, 1995, Sept. 15, 1999, July 12, 2000)) (on file with author).

228. *Id.*

229. *Id.*

230. *Id.*

231. ANWR STATUS REPORT, *supra* note 197, at 10.

232. *Id*.

Slope continue to naturally fluctuate today just as they have for thousands of years.[233]

Opponents also bring up the physical impacts of drilling in addition to the potential biological impacts[234] and question whether adequate safeguards would be enforced to prevent and clean up possible leaks and spills.[235] However, these critics ignore the fact that Congress and regulatory agencies have the ability to include rehabilitation requirements[236] similar to those imposed by the State of Alaska on the Prudhoe Bay fields.[237] Oil producers would be required to develop plans to rehabilitate their impacts and all plans would have to be assessed and approved by state and federal agencies.[238] Even in Prudhoe Bay, most spills are quite small, from a pint to ten gallons, and all spills are cleaned up, regardless of size.[239] In addition, most spills are contained on the gravel pads; those that are not contained generally contact only snow and ice because the North Slope operations area is covered in snow for most of the year, making removal easy.[240] Further, a trust fund could be established requiring that a percentage of revenues be set aside specifically for rehabilitation purposes.

V. CONCLUSION

Several policy considerations weigh in favor of opening ANWR for oil production. The impacts of drilling would likely be spread across the section 1002 area, but these impacts would be minimized by the industry, and rehabilitation would be required. Federal, state, and local regulations would be in place, and agencies would monitor progress and enforce compliance. Development of

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233. *Id.* ("There are more than 1 million caribou in Alaska divided into about 32 different herds or populations . . . . Caribou populations are known to vary dramatically over time. They often show a boom-and-bust cycle, due to predation, weather, overhunting, and other factors . . . . Populations continue to fluctuate as they have for thousands of years.").

234. CORN, *supra* note 200, at CRS-6 ("[T]here also would be impacts on the physical environment and resources of the area – land, air, and water – as a result of construction, operations, and human habitation.").

235. *Id.* ("Critics, however, are concerned about environmental effects of routine operations in the fragile 1002 environment, as well as the possibility of leaks and spills of various contaminating substances . . . .").

236. *Id.* at CRS-8.

237. BP EXPLORATION & PHILLIPS ALASKA, ARCTIC ENERGY 38 (Aug. 2001) [hereinafter ARCTIC ENERGY].

238. ANWR STATUS REPORT, *supra* note 197, at 7.

239. ARCTIC ENERGY, *supra* note 237, at 38.

240. *Id.*

ANWR can assist in realistically moving the United States away from dependence on foreign oil, and can do so with a larger benefit to the world's environment. It will take time before the United States is able to change its transportation and energy infrastructure, time during which oil will be imported from other countries. Do Americans want to get their oil from Russia, where for every barrel of oil pulled out of the ground, two or three are spilled; or from Columbia, where a native culture is being destroyed and workers' lives are risked because of guerrilla warfare; or from the Middle East, where oil revenues indirectly support terrorism; or from ANWR, where the American people, through elected officials, regulations, and direct voices, have a say in making sure that an oil field is developed in an environmentally sensitive way?

ANWR needs to be developed, but too many politicians are afraid of the issue because of ANWR's political sensitivity and Americans' general lack of environmental understanding about the North Slope. In the absence of congressional action opening ANWR for drilling, there are four avenues of resolution to the potential problem of Sourdough development draining oil from an undeveloped ANWR: (1) the Secretary of the Interior can lease ANWR through his implied executive authority; (2) the State of Alaska can take action against the United States to force field unitization,[241] placing the burden to prove drainage on the State; (3) the State of Alaska can bring suit against the United States, seeking a declaratory judgment to avoid future liability to the federal government for royalties on the drained oil;[242] or (4) the United States can take action to receive royalties, placing the burden of proving drainage on the federal government.

If either the State of Alaska or the federal government wishes to stake an affirmative claim to the oil located under ANWR, they will be required to prove drainage. To prove drainage, an expert must show that oil exists on the state land, and that based on the geology, that same pool of oil is economically productive on the ANWR side. If the data is sufficient, the analysis ends. Should ANWR be considered an undrilled prospect, then the existing data is presumptively unacceptable, requiring well data as conclusive proof of reserves. Under the more widely accepted AGA definition of "proved reserve," an expert attempt to show oil or gas re-

241. This also raises a constitutional question, under the Supremacy Clause, as to the validity of Alaska's claim against the federal government based in part on its own state statute, as well as other states' rights issues. However, these constitutional questions are beyond the scope of this Article.

242. Telephone Interview with John Norman, Shareholder, Hartig Rhodes Hoge & Lekish (Aug. 20, 2002).

coverability presumptively fails, since the AGA definition must consider *existing* operating conditions, which preclude development in ANWR.

The State of Alaska cannot afford *not* to proceed with Sourdough's development if it hopes to open the door to exploring ANWR's coastal plain. Sourdough is the key to this door. Even if the United States allows royalties to slip away to the State of Alaska once Sourdough production begins, Alaska's causes of action do not become moot. If Sourdough is developed, Alaska wins.