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Albert E. Utton

Paul D. McHugh

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On an Institutional Arrangement for Developing Oil and Gas in the Gulf of Mexico

INTRODUCTION

Since the Arab oil embargo of 1973-74, considerable attention has been devoted to vast reservoirs of oil and gas discovered in the Gulf of Mexico. During the past fifteen years technology advances and the need to increase investment in petroleum exploration programs have led both the United States and Mexico to significant new finds in the region.¹

As recently as 1984 more than thirty new oil and gas field discoveries were reported in the waters of the Gulf off the coast of the United States.² Together with already existing fields, these discoveries bring estimates of U.S. hydrocarbon resources to the range of from 1.3 to 8.3 billion barrels of oil³, and from 22.0 to 99.2 trillion cubic feet of natural gas.⁴ Although oil prices have plummeted in recent months, apparently diluting the importance of these resources, many experts predict that demand will again eventually outstrip supply.⁵ That occasion will resurrect the interest in energy resources close to home.

In 1980 U.S. geologists speculated that some regions off the Mexican coast might have "more giant oil and gas fields than any area in the world other than the Middle East, Western Siberia, the North Sea and the Permian Basin."⁶ They estimated that the areas with the most potential for development in the Gulf might contain between 21 and 63 billion barrels of oil, and between 12.3 and 52 trillion cubic feet of natural gas.⁷

*Professor of Law, University of New Mexico.

**J.D., University of New Mexico, Member of the New Mexico State Bar, Judge Advocate, Pope Air Force Base, North Carolina.

1. See Joyner, *U.S.-Mexican Energy Relations in the 1980's: New Resources Versus Old Dilemmas*, 12 CASE W. RES. J. INT'L L. 485 (1980), and *Mexican Search Nets Significant New Finds*, OIL AND GAS J., Aug. 30, 1982, at 94.

2. ENERGY INFORMATION ADMINISTRATION, U.S. CRUDE OIL, NATURAL GAS, AND NATURAL GAS LIQUIDS RESERVES: 1984 ANNUAL REPORT [hereinafter cited as 1984 ANNUAL REPORT], at 17.

3. *Id.* See also G. Dolton *et al*, UNITED STATES DEPARTMENT OF THE INTERIOR, ESTIMATES OF UNDISCOVERED RECOVERABLE CONVENTIONAL RESOURCES OF OIL AND GAS IN THE UNITED STATES (Geological Survey 860), table 4, at 22.

4. 1984 ANNUAL REPORT, *supra* note 2, at 17, and G. Dolton, *supra* note 3, table 7, at 25.

5. Valencia & Miyoshi, *Southeast Asian Seas: Joint Development of Hydrocarbons in Overlapping Claim Areas*, 16 OCEAN DEV. & INT'L L. 211, 212 (1986).

6. D. RONFELDT, R. NEHRING, & A. GANDARA, MEXICO'S PETROLEUM AND U.S. POLICY: IMPLICATIONS FOR THE 1980's 17 (A Rand Corporation/Department of Energy Study, 1980).

7. *Id.* One author attributes the making of such significant discoveries to the efficiency of Mexico's government-owned oil company, *Petroleos Mexicanos* (PEMEX). See Joyner, *Petroleos Mexicanos in a Developing Society: The Political Economy of Mexico's National Oil Industry*, 17 GEO. WASH. J. INT'L L. & ECON. 63, 64 (1982).

The wells in one area under Mexican jurisdiction, the Gulf of Campeche, are considered to be some of the most prolific in the world.⁸

Notwithstanding the importance of the above resources to the energy needs and the economies of the two nations concerned, even more important for the purpose of this article are the vast hydrocarbon resources in the maritime boundary region in the Gulf of Mexico, because of the impact their treatment might have on a developing area of international law. This article will focus on that region, which encompasses an area of the Gulf where jurisdiction over natural resources by the United States and Mexico has not yet been established (see Figure 1). It will explore international regulation of similar divided resources and examine what provision might be made for the efficient, economical, and coordinated exploitation of oil and gas fields which transcend international boundaries. Finally, it will recommend what action the United States and Mexico might take regarding future development of the resources in the maritime boundary region.

United States Department of Interior geologists estimate that undiscovered, in place petroleum resources in the maritime boundary region range from 2.24 to 21.99 billion barrels of oil, and from 5.48 to 44.40 trillion cubic feet of natural gas.⁹ Undiscovered resources are those not yet found, but estimated to exist as a consequence of favorable geologic conditions. In place refers to resources in place in the pore spaces of reservoirs, "without qualification as to what part may be considered either currently or potentially producible and without regard to any economic or technological constraints."¹⁰

The scientists divided the boundary region into six assessment areas on the basis of distinct geological characteristics: the Rio Grande Margin area, the Sigsbee Escarpment area, the Perdido Foldbelt area, the Sigsbee Knolls area, the Campeche Escarpment area, and the Abyssal Gulf area (see Figure 2).¹¹ Although oil and gas are present throughout the region, the areas which probably contain the most significant quantities are the Perdido Foldbelt and Sigsbee Knolls areas.¹² All areas are in water depths beyond current drilling and production technology. However, if technology advances as expected, experts anticipate that there will be operations in the maritime boundary region.¹³

8. *Mexican Search Nets Significant New Finds*, *supra* note 1, at 94-95.

9. Foote, Martin & Powers, *Oil and Gas Potential of the Maritime Boundary Region in the Gulf of Mexico*—3, *OIL & GAS J.*, Jan. 3, 1983, at 119.

10. Foote, Martin & Powers, *Oil and Gas Potential of the Maritime Boundary Region in the Gulf of Mexico*—2, *OIL & GAS J.*, Dec. 27, 1982, at 224. See also Anyigbo & Haynes, *Profitability of Newly Discovered Gas in Gulf of Mexico*, *OIL & GAS J.*, Aug. 30, 1982, at 119.

11. Foote, Martin & Powers, *Oil and Gas Potential of the Maritime Boundary Region in the Gulf of Mexico*—1, *OIL & GAS J.*, Dec. 20, 1982, at 86.

12. Foote, Martin & Powers, *supra* note 9, at 120.

13. *Id.*

FIGURE 1. Map of the Gulf of Mexico Showing the Maritime Boundary Region. Source: Foote, Martin, and Powers, *Oil and Gas Potential of the Maritime Boundary Region in the Central Gulf of Mexico*, 67 THE AMERICAN ASSOCIATION OF PETROLEUM GEOLOGIST BULLETIN, No. 7, July, 1983.

STATUS OF THE MARITIME BOUNDARY REGION

For centuries, the area which is the subject of this article would have been considered a part of the high seas—that is, an area which nations could not acquire or make subject to national sovereignty.¹⁴ In 1945, President Truman proclaimed that the government of the United States regarded the natural resources of the subsoil and the seabed of the continental shelf beneath the high seas, and contiguous to the coast of the United States, as appertaining to the United States, subject to its jurisdiction and control.¹⁵ The proclamation did not include objects within the water column above the seabed itself. Nor did the United States attempt

14. See Goldie, *International Law of the Sea—A Review of States' Offshore Claims and Competences*, NAV. WAR C. REV. 43 (1972) and L. Henkin, *Changing Law for the Changing Seas*, in *USES OF THE SEAS* 70-71 (Gullion ed. 1968).

15. Feldman & Colson, *The Maritime Boundaries of the United States*, 75 AM. J. INT'L L. 729, 730-31 (1981).

FIGURE 2. Map Showing Individual Resource Assessment Areas in the Gulf of Mexico Maritime Boundary Region. Source: Foote, Martin, and Powers, *Oil and Gas Potential of the Maritime Boundary Region in the Central Gulf of Mexico*, 67 THE AMERICAN ASSOCIATION OF PETROLEUM GEOLOGIST BULLETIN, No. 7, July, 1983.

to delimit a maritime boundary with Mexico immediately following the proclamation.¹⁶ But between 1945 and 1972 the United States and Mexico did enter into various agreements regarding regulation of fishing vessels in the States' territorial waters.¹⁷

In 1976 the Mexican government followed the example set by Chile and Peru in 1948, and established an "exclusive economic zone" of 200 miles in which it claimed control of "all resources living and nonliving, free floating and attached to the seabed, and under the ocean floor."¹⁸ Almost simultaneously, the United States Congress passed the Fishery

16. Schmitt, *The Problem of Maritime Boundaries in U.S.-Mexican Relations*, 22 NAT. RES. J. 139, 142 (1982).

17. *Id.* at 142-43.

18. *Id.* at 144.

Conservation and Management Act of 1976, which went into effect on March 1, 1977. Together with the Truman Proclamation, the Act effectively established a jurisdiction similar to an "exclusive economic zone."¹⁹

Both the United States and Mexico are signatories to the 1958 Geneva Convention on the Continental Shelf. The Convention provides that the boundary between coastal States sharing the same shelf "is the median line, every point of which is equidistant from the nearest points of the baselines from which the breadth of the territorial sea of each State is measured," unless there are special agreements or special circumstances that dictate otherwise.²⁰ Therefore, if the maritime boundary region involved the continental shelf only, any delimitation would be governed by the equidistance principle.

In the *Case Concerning Delimitation of the Maritime Boundary in the Gulf of Maine Area*, a Chamber of the International Court of Justice enunciated the following prescription of general international law for delimitation of not only the seabed and the subsoil, but also the overlying water column:

(1) No maritime delimitation between States with opposite or adjacent coasts may be effected unilaterally by one of those States. Such delimitation must be sought and effected by means of an agreement, following negotiations conducted in good faith and with the genuine intention of achieving a positive result. Where, however, such agreement cannot be achieved, delimitation should be effected by recourse to a third party possessing the necessary competence.

(2) In either case, delimitation is to be effected by the application of equitable criteria and by the use of practical methods capable of ensuring with regard to the geographic configuration of the area and other relevant circumstances, an equitable result.²¹

The United States and Mexico did, in fact, conduct good faith negotiations with the intention of delimiting a maritime boundary in the Gulf of Mexico. President Carter submitted a resulting treaty to the Senate in April 1979 for ratification.²² The Senate, however, refused to ratify the treaty because of testimony indicating that the United States might receive a smaller share of hydrocarbon resources as a result of the use of certain islands off the Yucatan Peninsula as baselines for the boundary determination.²³

19. *Id.* at 144-45.

20. Art. 6(1), Convention on the Continental Shelf, April 19, 1958, T.I.A.S. No. 5578, 15 U.S.T. 472, 499 U.N.T.S. 311.

21. Delimitation of the Maritime Boundary in the Gulf of Maine Area (Can. v. U.S.), 1984 ICJ REP. 246 (Judgment of Oct. 12), reprinted in 23 I.L.M. 1197 (1984).

22. Schmitt, *supra* note 16, at 147.

23. Székely, *A Commentary with the Mexican View on the Problem of Maritime Boundaries in U.S.-Mexican Relations*, 22 NAT. RES. J. 155, 157-58 (1982).

The jurisdictional lines dividing the maritime boundary region in the Gulf of Mexico remain undelineated.²⁴ But the time for the two countries who share the region's resources to negotiate a policy for the development of those resources is now—particularly since the two States can develop a policy before the technology exists to exploit the resources without cooperation. An examination of municipal laws and developing State practices may suggest the most efficient manner of developing shared resources.

THE NEED FOR UNITIZATION

Municipal Practice

Geologic structures containing gas and oil do not conform to property lines, licensing demarcations, or political boundaries. Petroliferous structures containing oil and gas are characteristically porous formations surrounded by an impermeable strata which traps the oil or gas in the porous formation. Salt domes frequently form the structural basis for entrapment.²⁵ Since reservoirs are normally under heavy pressure, compressed oil and gas escape when well drilling pierces the impermeable formation. The contents of the reservoir then migrate to the point where the well is drilled, draining the reservoir without regard to surface property lines.²⁶ This migratory feature of oil and gas has been a basic cause of disputes settled by courts in domestic jurisdictions.²⁷

In the formative period of oil and gas law in the United States, the courts were without adequate understanding of the physical properties of oil and gas and consequently used the law of capture by analogy to wild animals. The courts held that oil and gas belonged to the owner of the supra-adjacent land, so long as he controlled the oil or gas; but if it escaped to an adjoining tract of land and that owner captured it and possessed it, the former owner lost all right and title to it.²⁸ The only remedy of any owner was to drill first and recover the oil or gas before his neighbor did.²⁹ In the absence of regulation, unrestricted races de-

24. Telephone interview with O.W. Girard, United States Department of The Interior (Nov. 29, 1985).

25. J. Haun & G. Lucas, *Origin and Accumulation of Gas*, NATURAL GAS, COAL, GROUND WATER 71 (Western Resources Conference 1966). Most of the following discussion of municipal unitization practice is adapted from Professor Utton's previous writing in Utton, *Institutional Arrangements for Developing North Sea Oil and Gas*, 9 VA. J. INT'L L. 66 (1968).

26. Williams, *Compulsory Pooling and Unitization of Oil & Gas Rights*, 15 OIL & GAS INSTITUTE 223 (1964).

27. Kaveler, *The Engineering Basis for and the Results from the Unit of Operation of Oilpools*, 23 TUL. L. REV. 331 (1948).

28. See Hardwicke, *The Rule of Capture and Its Implications as Applied to Oil and Gas*, 13 TEX. L. REV. 391 (1935); Meyers, *The Necessity of Unitization—The Answer to Oil and Gas Conservation* 7 U.C.L.A. L. REV. 312 (1960); Ely, *The Conservation of Oil*, 51 HARV. L. REV. 1209, 1218 (1938); Jacobs, *Unit Operation of Oil and Gas Fields*, 57 YALE L. J. 1206 (1947-48).

29. Jacobs, *supra* note 28, at 1207-08.

veloped to exploit the resource reservoir. There was every incentive to drill as many wells as quickly as possible in order to maximize the share of the resource. Little or no regard was given to the economic development of the reservoir as a whole. The result was chaotic waste—physical waste of the resource, and economic waste caused by the pell mell drilling of unnecessary wells.³⁰

Well spacing legislation, designed to limit the number of wells that could be drilled in a given area,³¹ was enacted to stop the drilling of unnecessary wells.³² Too many wells reduced the pressure of the reservoir and thereby reduced the recovery from the reservoir as a whole. Moreover, significant economic waste resulted from loss of capital squandered in drilling unnecessary wells.³³

Once the number of wells was controlled, the next step was to regulate the amount of oil or gas each well was allowed to produce. Proration statutes established the production allowable per well in relation to market demand. Uncontrolled production exceeded market demand, drove prices down, and thereby caused some smaller unprofitable wells to be abandoned.³⁴ In the early 1930s, for example, production of a million barrels of oil each day in the East Texas oil field drove the price down to ten cents per barrel.³⁵ In addition, excessive production meant oil or gas had to be stored above ground, where it was subject to evaporation, leakage, and fire.³⁶ Compounding this physical waste, of course, was the economic waste of having to build unnecessary storage facilities.

The establishment of drilling units through well spacing, and production control by market demand statutes, were valuable steps toward the rational use of the resource. However, still more difficult problems require unit development of oil or gas fields underlying surface property lines or political boundaries.³⁷ The geological unity of the underground reservoir and the fugacious nature of its contents dictate that both outputs and inputs related to the reservoir as a whole must be carefully coordinated in order to achieve the best use of the resource.³⁸ Well spacing legislation reduces unnecessary drilling, but well placement is still governed by

30. Meyers, *supra* note 28, at 1.

31. H. WILLIAMS & C. MEYERS, OIL & GAS LAW 5 (1968).

32. In some instances, even with the well spacing statutes, so many exceptions have been granted as to diminish the effectiveness of the statute. Meyers, *supra* note 28, at 2.

33. Ely, *supra* note 28, at 1218-22.

34. C. MEYERS, THE LAW OF POOLING AND UNITIZATION 8-9 (1957).

35. *Id.*

36. Hazlett, *Unitization of Oil and Gas Reservoirs: A Reply to Merrill*, 63 MICH. L. REV. 519, 524 (1965).

37. See *id.* See also EUGENE V. ROSTOW, A NATIONAL POLICY FOR THE OIL INDUSTRY (1948), where the author states, at 45, that it is preferable "to impose unitary operations on the field, rather than to undertake further experiments with the cumbersome, expensive and unsatisfactory plan of prorationing."

38. See Kaveler, *supra* note 27, at 338-43.

surface property boundaries which do not necessarily coincide with optimum geologic placement. Well placement based on the geology of the reservoir, rather than surface political boundaries, can maximize primary production. Depending upon the use of the natural pressure of the reservoir to bring the oil or gas to the surface, primary production is seldom capable of recovering more than fifteen to twenty-five percent of the oil in the reservoir. By using secondary recovery or pressure maintenance methods however, the recovery figures can be increased to eighty percent.³⁹ Secondary recovery usually involves injecting of compressed gas or fluid into the reservoir to increase or maintain the pressure.⁴⁰ Newer, more complex methods of enhanced recovery, known as tertiary recovery, include surfactant flooding, carbon dioxide flooding, steam injection, and fire flooding.⁴¹ Efficiency and optimum use require the use of injection and concomitant production operations on a reservoir-wide basis.

Most American jurisdictions view unitization as the best way to administer divided petroliferous structures. Unitization is defined as "the joint operation of all or some portion of a producing reservoir."⁴² The consensus was aptly reflected two decades ago by an American Bar Association statement:

It is only through unit operation that the logical and complete application of present technical knowledge of oil and gas conservation can be accomplished. It is only through unit operation of a common source of supply that individual property rights can be fully protected. It is only through unit operation that the maximum recovery can be achieved and the maximum rate of daily production maintained.⁴³

American experience with both voluntary and compulsory unitization is extensive. Many states, as well as several Canadian provinces, have compulsory unitization laws.⁴⁴ And although there has been some considerable resistance to a compulsory unitization,⁴⁵ the difficulties of voluntary unitization have led to adoption of compulsory unitization by more and more oil and gas producing states.⁴⁶

39. MEYERS, *supra* note 34, at 23-25.

40. Kaveler, *Conservation in Production Through Unit Operation*, OIL FOR TODAY AND TOMORROW 46, 51 (1953). King, *Pooling and Unitization of Oil and Gas Leases*, 46 MICH. L. REV. 311, 314 (1948).

41. Anderson, *Mutiny: The Revolt Against Unsuccessful Unit Operations*, 30 ROCKY MTN. MIN. L. INST. 13-1, 13-5 n.6 (1984).

42. *Id.* at 13-3.

43. Quoted in MEYERS, *supra* note 34, at 12.

44. MEYERS, *supra* note 34, at 13; Whittier, *Compulsory Pooling and Unitization: Die-Hard Kansas*, 15 KANS. L. REV. 307, 311 (1967).

45. See MEYERS, *supra* note 34, at 13; Whittier, *supra* note 44, at 312; Comment, *Compulsory Unitization—the Answer to Oil and Gas Conservation* 7 U.C.L.A. L. REV. 312, 319 (1960).

46. Voluntary unitization plans were frequently unsatisfactory because in some instances there was need for agreement by 100 percent of all the owners in situations where there were many small owners. The mechanical difficulties in locating the many and widely scattered owners caused costly

In 1945 Oklahoma became the first major oil producing state to enact compulsory unitization.⁴⁷ By 1960, ten states had done so,⁴⁸ and by 1984 the number had jumped to 32.⁴⁹ Most statutes require that more than a majority percentage of the owners agree to unit development. Mississippi requires 85 percent and New York requires 60 percent, while most other states have a 75 percent requirement.⁵⁰

The typical procedure is for those interested owners to prepare a unit development plan and submit it to the relevant state agency for adoption. Hearings are held with all interested parties accorded an opportunity to appear. If statutory requirements for conservation, development, and percentage of consenting owners are satisfied, the agency may order non-consenting and consenting owners to participate in the plan. An operating committee representing all owners, consenting and non-consenting alike,

delays, and the efforts were often abortive because the failure of one small land owner to agree would block the entire attempt. Jacobs, *Unit Operation of Oil and Gas Fields*, 57 YALE L. J. 1207, 1212 (1947-48). The minority, incompetency or unknown whereabouts of a single owner could block agreement. To place such a premium on the agreement of a single owner often puts him in a commanding bargaining position from which he might extract an inflated price for his agreement. INTERSTATE OIL COMPACT COMMISSION, A STUDY OF THE OIL AND GAS IN THE UNITED STATES 200 (1964). Even in those unusual unit agreements where unanimous consent was not required, those who tried to proceed under the agreement ran into serious problems. The efficiency of pressure maintenance operations depends upon placement of wells and control of levels of extraction and of gas and liquid inputs. Without complete unitization the engineers may be inhibited in the placement of the wells; and if input wells to maintain pressure are injecting water, gas, or air into the petrolifc structure, they will drive oil and gas on to neighboring property which may belong to a nonparticipant in the unitization, thereby increasing his production at no cost to him. MEYERS, *supra* note 34, at 9. These and other shortcomings of voluntary unitization have led to compulsory unitization legislation. See MEYERS, *supra* note 34, at 7, for a discussion of these shortcomings.

47. OKLA. STAT. ANN. tit. 52, sections 287.1-287.15 (1951), as amended, (Supp. 1966).

48. ALA. CODE tit. 26, § 179(70) (1958); ALASKA. STAT. § 35.05.110 (1962); ARK. STAT. ANN. §§ 53-115 (Supp. 1965); CAL. PUB. RES. CODE §§ 3315-3347 (West Supp. 1966); FLA. STAT. ANN. § 377.28 (1960); GA. CODE ANN. § 43-717 (1957); LA. REV. STAT. ANN. § 30.5 (1951); NEV. REV. STAT. § 522.170 (1961); WASH. REV. STAT. § 78.52.330 (1962).

49. ALA. CODE § 9-17-13 (1980); ALASKA. STAT. § 31.05.110 (1979); ARIZ. REV. STAT. ANN. §§ 27-531 to -540 (1976); ARK. STAT. ANN. § 53-115 (1971 & Supp. 1983); CAL. PUB. RES. CODE §§ 3315-3347 and 3640-3659 (West 1972 & Supp. 1984); COLO. REV. STAT. § 34-60-118 (1973); FLA. STAT. ANN. § 377.28 (West Supp. 1984); GA. CODE ANN. § 43-706 (Supp. 1982); ILL. ANN. STAT. ch. 96 1/2, §§ 5440-5453 (Smith-Hurd 1979 & Supp. 1983); KAN. STAT. ANN. §§ 55-1301 to -1315 (1983); KY. REV. STAT. § 353.652 (1983); LA. REV. STAT. ANN. § 30:5 (West 1975); MICH. COMP. LAWS ANN. §§ 319.351-.375 (West 1984); MISS. CODE ANN. § 53-3-7 (1972); MO. ANN. STAT. § 259.120 (Vernon 1984); MONT. CODE ANN. §§ 82-11-204 to -216 (1983); NEB. REV. STAT. §§ 56-910 to -910.12 (1978); NEV. REV. STAT. §§ 522.082-.0878 (1983); N.M. STAT. ANN. §§ 70-7-1 to -7-21 (1978); N.Y. ENVTL. CONSERV. § 230901 (McKinney 1973 & Supp. 1983); N.D. CENT. CODE §§ 38-08-09.1 to -09.17 (1980 & Supp. 1983); OHIO REV. CODE ANN. § 1509.28 (Page 1978); OKLA. STAT. ANN. tit. 52, §§ 287.1 to .12 (West 1969); OR. REV. STAT. §§ 520.260 to .330 (1983); S.C. CODE ANN. § 48-43-350 (Law. Co-op. Supp. 1983); S.D. CODIFIED LAWS ANN. §§ 45-9-37 to -51 (1983); TENN. CODE ANN. § 60-1-202 (1980); UTAH CODE ANN. § 40-6-7 (Supp. 1983); VT. STAT. ANN. tit. 29 § 525 (Supp. 1983); WASH. REV. CODE ANN. §§ 78.52.33052.460 (1962 & Supp. 1984); W. VA. CODE § 22-4A-8 (1981); WYO. STAT. § 30-5-110 (1983). Cited in Anderson, *supra* note 40, at 13-4 n.5.

50. See Utton, *supra* note 25, at 78 n.78. For a discussion of the ethical issues related to the duty of fair dealing in pooling and unitization and the implied duty to pool or unitize, see also Handlan & Sykes, *Pooling and Unitization: Legal and Ethical Considerations*, 19 TULSA L. J. 309 (1984).

is then established. Finally, a unit operator is appointed, and costs and revenues are allocated by formula to the various owners.⁵¹

The municipal laws of most of the world's oil-producing nations have developed in a manner similar to those of the United States. Today, a majority of those nations have laws which specifically provide that:

when an oil-bearing structure is located in two or more tracts belonging to two or more different owners and thus the source of dispute between them as to apportionment, the interested parties are obliged to adopt a unitized plan of development under which competition is now altogether eliminated and cooperation is required on coordinating such points as number and spacing of wells tapping the common source.⁵²

Related International Practice

Necessity and technology have combined to advance the discovery of petroleum finds on various continental shelves throughout the world. Just as with the resources within nations, the finds are migratory. Oil and natural gas, like wildlife, ". . . move around as gravity, currents, [or] pressure . . . moves them; grizzly bears don't stop at customs."⁵³ In some ways, international practice has paralleled that of individual nations in dealing with the problems caused by nature of these resources.

The attitude that the "rule of capture" should govern the treatment of natural resources was reflected in the International Covenant on Economic, Social, and Cultural Rights. The Covenant, signed in 1967, provides that "all peoples may . . . freely dispose of their natural resources without prejudice to any obligation arising out of international economic cooperation. . . ."⁵⁴ An earlier United Nations resolution had already identified the "inalienable right of a State freely to dispose of their natural wealth and resources in accordance with their national interests."⁵⁵

At about the same time that these pronouncements were made by representatives of the United Nations, the International Court of Justice indicated that it recognized the problem arising from shared deposits of natural resources. In its judgment in the *North Sea Continental Shelf Cases*, the Court said:

51. For a thorough discussion of how unitization for enhanced recovery is established for a field, see Giles, "Putting Secondary Recovery Units Together," *Oil and Gas Pooling and Unitization* 6-1 (Rocky Mt. Min. L. Fdn., 1980).

52. Onorato, *Apportionment of an International Common Petroleum Deposit*, 17 INT'L & COMP. L. Q. 85, 92 (1968).

53. Coggins, *Grizzly Bears Don't Stop at Customs: A Preface to Transboundary Problems in Natural Resources Law*, 32 KAN. L. REV. 1, 5 (1983).

54. 21 U.N. GAOR Supp. (No. 16) 49, UN. Doc. A/6316 (1967), reprinted in B. WESTON, R. FALK & A. D'AMATO, BASIC DOCUMENTS IN INTERNATIONAL LAW AND WORLD ORDER 196 (1980).

55. 17 U.N. GAOR Supp. (No. 17) 15, U.N. Doc. A/5217 (1963), reprinted in B. WESTON, R. FALK & A. D'AMATO, BASIC DOCUMENTS IN INTERNATIONAL LAW AND WORLD ORDER 259 (1980).

it frequently occurs that the same deposit lies on both sides of the line dividing a continental shelf between States, and since it is possible to exploit such deposit from either side, a problem immediately arises on account of the risk of prejudicial or wasteful exploitation by one or the other of the States concerned.⁵⁶

Nevertheless, writers continued to espouse a concept similar to the "rule of capture." For example, some advocated that nations should resolve the problem by applying what they called the "prior appropriation rule." The rule gives the first country to undertake extraction the right to exploit the entire deposit.⁵⁷ Fortunately, no such rule of international law has developed.

One scholar has suggested that a rule of international law exists which would give neighboring States joint property rights to a common deposit of hydrocarbon resources. Based upon his analysis of the practice of nations, he concludes that no State may exploit the common deposit without the consent of the neighbor who shares that deposit.⁵⁸ In a comprehensive analysis of agreements between States which share resources bisected by a political boundary, Rainer Lagoni⁵⁹ indicates that there is little legal foundation for the basic assumption that States have joint property rights to the deposit.⁶⁰

Lagoni views State practice as consisting primarily of bilateral agreements, which he divides into those which deal with common deposits that might be discovered in the future, and those already discovered.⁶¹ He notes that one-half of the delimitation agreements concluded after 1942, and nearly all agreements on continental shelf areas since 1970, include a mineral deposit clause calling for cooperation between the contracting parties if common deposits are discovered in the future.⁶² The former category of bilateral agreements is most helpful to an analysis of what course of action the United States and Mexico should take regarding the oil and gas resources already discovered in the maritime boundary region of the Gulf of Mexico.⁶³

56. [1969] ICJ REP 51, para. 97.

57. See Ely, *supra* note 28, at 1218 *et seq.*; H. WILLIAMS, R. MAXWELL & C. MEYERS, CASES AND MATERIALS ON THE LAW OF OIL AND GAS 57 (1970).

58. Onorato, *supra* note 52, at 325.

59. Institute for International Law, University of Kiel, Federal Republic of Germany.

60. Lagoni, *Oil and Gas Deposits Across National Frontiers* 73 AM. J. INT'L L. 215, 221 (1979). See also Goldie, *Equity and the International Management of Transboundary Resources*, 25 NAT. RES. J. 665, 687-90 (1985), and Székely, *The International Law of Submarine Transboundary Hydrocarbon Resources: Legal Limits to Behavior and Experience for the Gulf of Mexico*, in this volume.

61. *Id.* at 222.

62. *Id.* at 233.

63. For a discussion of the factors influencing consideration of joint development of resources in maritime boundary areas, see Valencia & Miyoshi, *supra* note 5, at 217. Some of the factors which the authors review include: the relations and spirit of cooperation already existing between the neighboring countries; their need for oil; geographical complications, such as islands in the area; the incentive to avoid litigation of claims; and security considerations.

According to Lagoni, four kinds of cooperation agreements exist in State practice; the kind chosen depends upon the States' reasons for cooperating in exploring and exploiting common deposits. The first, called "geological cooperation," is typified by an agreement between Czechoslovakia and Austria dealing with a deposit of natural gas in the Vysoka-Zwerndorf frontier area.⁶⁴ The purpose of the agreement is to ensure that "each party receives a share of the total production in proportion to the amount of reserves in its territory at the time the agreement was concluded."⁶⁵ A joint commission provides calculations to the parties to guide their exploitation of the gas, and it sets waste-avoiding conditions for both States. Through information exchange and consultation, Czechoslovakia and Austria cooperate to efficiently provide a product to consumers in both countries.⁶⁶

A second kind of cooperation agreement encourages concessionaires of both parties to engage in joint operations. An example of such an agreement is the Supplementary Agreement of 1962 to the Ems-Dollart Treaty between the Netherlands and the Federal Republic of Germany.⁶⁷ The treaty sets procedures for development of the Ems River estuary, which each country claims as its own. The parties reserved their legal positions on the course of the international frontier, but agreed to a preliminary dividing line. Concessionaires from each country must cooperate closely with their counterparts in the other so that each nation receives an equal share of the petroleum and natural gas extracted. The agreement also provides for dispute resolution for instances when the concessionaires are unable to agree.⁶⁸

Third, parties may agree to exercise joint power over an area's mineral resources. Lagoni characterizes such an arrangement as "a functionally limited condominium."⁶⁹ Several Middle Eastern States have entered into such agreements. In 1965 Saudi Arabia and Kuwait partitioned a strip of land located between them at the Persian Gulf and called it the Neutral Zone.⁷⁰ There, the parties retain equal rights to all natural resources recovered. The Ministers of Natural Resources of the two States grant joint concessions for exploitation, based upon the recommendations of a

64. Agreement Concerning the Working of Common Deposits of Natural Gas and Petroleum, Jan. 23, 1960, Czechoslovakia-Austria, art I, Jan. 23, 1960, 495 U.N.T.S. 134 (1964).

65. Lagoni, *supra* note 60, at 222.

66. *Id.*

67. Supplementary Agreement to the Treaty Concerning Arrangements for the Co-Operation in the Ems Estuary (Ems-Dollart Treaty), April 8, 1960, Netherlands-Federal Republic of Germany, 509 U.N.T.S. 140.

68. Lagoni, *supra* note 60, at 222-23.

69. *Id.* at 226.

70. Agreement Relating to the Partition of the Neutral Zone, July 7, 1965, Kuwait-Saudi Arabia, *reprinted in* 4 I.L.M. 1134 (1965).

joint permanent commission. The agreement also calls upon the two countries to cooperate fully to protect the rights to the shared resources.⁷¹

The Agreement on Settlement of Maritime Boundary Lines and Sovereign Rights over Islands Between Qatar and Abu Dhabi,⁷² signed in 1969, calls upon its signatories to equally share the al-Bunduq petroleum field in the Persian Gulf. The parties exercise joint sovereign rights over the field, and have agreed to consult periodically on all matters in order to exercise their rights on an equal basis. They also equally share all royalties, profits, and fees.⁷³

In 1974 Sudan and Saudi Arabia established a "Common Zone" in an area of the Red Sea where semi-liquid metalliferous brines had been discovered.⁷⁴ Their agreement gives each country equal sovereign rights to all of the natural resources in the Common Zone. Also, the parties are to protect and defend their claimed rights against third parties. A joint commission has the power to determine the method of exploitation of the resources, as well as to grant concessions and to supervise production itself.⁷⁵

The final example of cooperation agreements perhaps most closely approximates the current status of municipal legislation. These agreements provide for unitized exploitation of common deposits of hydrocarbon resources. An early paradigm is the 1974 treaty between Japan and South Korea governing part of the continental shelf adjacent to both of their coasts, the jurisdictional boundaries of which had not yet been determined.⁷⁶ The agreement established a Joint Development Zone, which was in turn divided into several subzones. The concessionaires of both Japan and South Korea enter into operating agreements which regulate who shall operate each subzone, how expenses will be shared, and who shall handle sole-risk operations. The agreements also provide for dispute resolution.⁷⁷ The concessionaires share equally in the resources exploited, and in expenses. Jurisdiction in the Joint Development Zone is determined as follows:

71. Lagoni, *supra* note 60, at 226-27.

72. Agreement on Settlement of Maritime Boundary Lines and Sovereign Rights Over Islands Between Qatar and Abu Dhabi, Mar. 20, 1969, *reprinted in* 5 *NEW DIRECTIONS IN THE LAW OF THE SEA* 223 (Churchill *et al.* ed. 1977).

73. Lagoni, *supra* note 60, at 227.

74. Agreement Relating to the Joint Exploitation of the Natural Resources of the Sea-Bed and Sub-Soil of the Red Sea in the Common Zone, May 16, 1974, Sudan-Saudi Arabia, United Nations Legislative Series, National Legislation and Treaties Relating to the Law of the Sea, U.N. Doc. ST/LEG/SER.B/18 (1976), at 452.

75. Lagoni, *supra* note 60, at 227-38.

76. Agreement Concerning Joint Development of the Southern Part of the Continental Shelf Adjacent to the Two Countries, Feb. 5, 1974, Japan-Republic of Korea, *reprinted in* 4 *NEW DIRECTIONS IN THE LAW OF THE SEA* 117 (Churchill *et al.* ed. 1975).

77. Lagoni, *supra* note 60, at 224-25.

- (1) The share of a concessionaire of one party is regarded as natural resources extracted from the continental shelf of that party;
- (2) each subzone is governed by the laws and regulations of the party whose authorized concessionaires are acting as operator; and
- (3) neither party may impose taxes or other charges upon the concessionaires of the other party.⁷⁸

A Joint Commission comprised of representatives of both nations reviews annual technical and financial reports from the concessionaires, and the overall working of the agreement.⁷⁹

During the same year France and Spain established a similar *zone speciale* in the Gulf of Biscay. Unlike the agreement between Japan and South Korea, this one also settled the question of sovereignty.⁸⁰ Although each party has sovereign rights over the resources on its side of the dividing line, the agreement encourages concession applicants to conclude accords of association with applicants nominated by the other party. The accords thus established are then able to participate on an equal footing in exploiting the resources in the special zone. The associations effectively function as single unit operators in exploiting the area's oil and gas.⁸¹

Two years later Great Britain and Norway agreed that exploitation of the Frigg Field reservoir of natural gas as a "single unit" would be the most efficient manner to extract their shared deposits.⁸² Because the continental shelf demarcation is the controlling factor for apportioning the in place reserves, they agreed that Norway should receive 60 percent and Great Britain 40 percent of production, subject to reassessments made necessary by changing conditions in the deposit. While the governments themselves cooperate on numerous matters, the agreement calls for them to require their licensees to appoint a unit operator for the deposit. The agreement is implemented by a body established by the parties, the Frigg Field Consultative Commission. It deals with many matters of concern to both parties, such as "the influx of gas from other deposits, joint conservation schemes, freedom of access to the installations, uniform construction standards and safety inspections, taxation, and the laying of a pipeline to the British coast."⁸³ Because of the detail the treaty provides, Lagoni views it as a possible model for future agreements dealing with common deposits of hydrocarbon resources in offshore areas.⁸⁴

78. *Id.* at 225.

79. *Id.*

80. Convention on the Delimitation of the Continental Shelves of the Two States in the Bay of Biscay (Golfe de Gascogne/Golfo de Vizcaya), Jan. 29, 1974, France-Spain, 996 U.N.T.S. 345 (1976).

81. Lagoni, *supra* note 60, at 225.

82. Agreement Relating to the Exploitation of the Frigg Field Reservoir and the Transmission of Gas Therefrom to the United Kingdom, May 10, 1976, United Kingdom-Northern Ireland-Norway, reprinted in 5 NEW DIRECTIONS IN THE LAW OF THE SEA 398 (Churchill *et al.* ed. 1977).

83. Lagoni, *supra* note 60, at 226.

84. *Id.* at 225-26.

RECOMMENDATION

Although the history of United States and Mexican territorial relations has often been characterized by hostility,⁸⁵ the two States have usually successfully negotiated to settle disputes as to jurisdiction over the resources of the seas.⁸⁶ When President Carter submitted a treaty to the Senate in 1979, ratification seemed certain. However, since 1981 when the Senate postponed action to allow further study of objections raised by U.S. geologists,⁸⁷ the status of the treaty has remained unchanged. Today's circumstances, on the other hand, dictate that the United States develop a more comprehensive policy in its relations with its southern neighbor, rather than dealing with problems on an *ad hoc* basis.⁸⁸

Although OPEC is no longer as cohesive and, therefore, not as influential as it was ten years ago,⁸⁹ the need for countries to develop their petroleum resources as efficiently as possible remains. Most oil-producing nations have recognized that unitization is the best way to achieve maximum recovery.⁹⁰ The trend in international practice is also in the direction of cooperation. In fact, almost uniformly States include in delimitation agreements cooperative provisions in case oil is later discovered. On that basis Lagoni hypothesizes that, ". . . the practice of negotiating and seeking agreement on the exploration and exploitation of a common deposit and the apportionment of the minerals is not mere usage, but has given rise to a customary rule of international law."⁹¹

Even though the United States and Mexico have not yet agreed to a delimitation of the maritime boundary region, the existence of oil and gas resources there is certain. Other agreements provide examples of States which have agreed to cooperate in the exploitation of resources of a zone where the political boundaries are still undetermined.⁹² The United States and Mexico need not "muddle through" to unitization. International agencies which have existed for decades, particularly those administering international water resources,⁹³ may provide models for the structure, composition and procedures of a commission to administer the deposits in the maritime boundary region. Now, the two countries may look to municipal legislation and the agreement between Great Britain and Norway⁹⁴

85. Székely, *supra* note 23, at 155.

86. Schmitt, *supra* note 16, at 140.

87. *Id.* at 149.

88. For a discussion of the concept that the United States should pursue relations with Mexico within the framework of a "community" of nations, see D. RONFELDT, R. NEHRING & A. GANDARA, *supra* note 6, at 94-97.

89. See *Remember the Oil Noose?* N.Y. Times, Aug. 12, 1985, at A16, col. 1, and *Gasoline Price Drop is Seen*, N.Y. Times, Aug. 14, 1985, at D9, col. 1.

90. See *supra* note 52 and accompanying text.

91. Lagoni, *supra* note 60, at 235.

92. See *supra* notes 68, 75, and 76 and accompanying text.

93. 747 PARL. DEB., H.C. (5th Ser.) 979 (1967).

94. See *supra* note 83 and accompanying text.

for working models of the mandate of authority to be given to a U.S.-Mexican commission. Such a mandate might read as follows:

If at any time the Commission shall be satisfied that the strata in the Treaty area or any part thereof contain part of a single mineral deposit which extends beyond the boundary of the continental shelf of one of contracting parties into the Special Zone as identified by the treaty, and if the Commission shall consider that it is in the interest of the contracting parties, in order to secure the maximum recovery of the mineral and in order to avoid unnecessary competitive exploitation, that the deposit should be worked and developed as a unity in cooperation by all persons whose licenses extend to or include any part thereof, then the following provisions of this clause shall apply.

Upon being so required by notice in writing by the Commission, the Licensee shall cooperate with such other persons as may be specified in the said notice in the preparation of a scheme (hereinafter referred to as "a development scheme") for the working and development of the deposit as a unit by the Licensee and the other Licensees in cooperation, and shall, jointly with the other Licensees, submit such scheme for the approval of the Commission.

The said notice shall also contain or refer to a description of the area or areas in respect of which the Commission requires a development scheme to be submitted, and shall state the period within which such scheme is to be submitted for approval by the Commission.

If a development scheme shall not be submitted to the Commission within the period so stated or if a development scheme so submitted shall not be approved by the Commission, the Commission may prepare a development scheme which shall be fair and equitable to the Licensee and other Licensees, and the Licensee shall perform and observe all the terms and conditions thereof.⁹⁵

As with many municipal plans, it is reasonable to allow licensees an opportunity to agree voluntarily to unit development and to propose development plans; but the commission should have the power to disapprove any plans submitted after adequate notice and opportunity for hearing has been afforded all interested parties. Moreover, the agency should be authorized to establish unit development on its own initiative, and to administer unit development, once established. A commission with authority such as that provided in the above mandate would have the advantage of being able to develop experience and expertise so as to most effectively develop the resources in the maritime boundary region of the Gulf of Mexico.

95. Professor Utton proposed a similar mandate more than 15 years ago for a commission to oversee exploitation of resources in the North Sea; see Utton, *supra* note 25, at 80-81.