TRANSBOUNDARY PETROLEUM RESERVOIRS: A RECOMMENDED APPROACH FOR THE UNITED STATES AND MEXICO IN THE DEEPWATERS OF THE GULF OF MEXICO

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I. INTRODUCTION

The Gulf of Mexico (GOM) contains important reserves of oil and natural gas. Some of these reserves have been exploited and produced by Mexico and the United States during the few last years. However, the exploitation of these resources has been slow because much of this resource base is located in ultra-deep waters of the GOM, where exploitation and production are very risky, and where the required advanced technology has been recently developed.

In view of this situation, until a few decades ago, there was little conflict between the United States and Mexico regarding the exploitation of oil and natural gas reserves in the GOM. Each country was able to produce those resources located in the adjacent shallow waters of the GOM, far from the maritime boundaries that divide the deep GOM.

The United States and Mexico have delimited all of their maritime boundaries in the GOM.[1] In 1978, when the United States and Mexico signed the Treaty on Maritime Boundaries, no mention was made regarding the exploration, exploitation, and production of the oil and natural gas reservoirs that could cross their maritime boundaries (*i.e.*, transboundary reservoirs

1. *See generally* Treaty Between the Government of the United Mexican States and the Government of the United States of America on the Delimitation of the Continental Shelf in the Western Gulf of Mexico Beyond 200 Nautical Miles, art. I, U.S.–Mex., June 9, 2000, S. Treaty Doc. No. 106–39 [hereinafter Western Gap Treaty] (setting specific coordinates for the continental shelf boundary between the United States and Mexico in the GOM). However, this is not the only treaty between the U.S. and Mexico in effect in the GOM. *See infra*.

or common deposits).[2] Nevertheless, it was the very issue of transboundary reservoirs in deep-waters of the GOM that delayed the United States' ratification of the Treaty on Maritime Boundaries for almost twenty years, until 1997.[3]

Because the Treaty on Maritime Boundaries left an area of the Continental Shelf[4] of the GOM (hereinafter the Western Gap) undecided, a new treaty was signed between the two countries in 2001.[5] This new treaty, which covers the Western Gap exclusively, establishes a buffer zone of 1.4 nautical miles on each side of the boundary, in which there is a moratorium of ten years against the exploitation and production of any oil and natural gas.[6]

Thus, in the GOM there are two treaties that set the maritime boundaries between the United States and Mexico, of which, one contemplates and regulates transboundary reservoirs. The Western Gap is subject to a ten-year moratorium on the exploitation of hydrocarbons, but the rest of the GOM is available for exploitation by each country on its side of the boundary.[7]

This situation, coupled with other technical, economic, and political factors, has caused transboundary reservoirs in the GOM to be of particular concern to both countries.

The development of new technologies has allowed for the exploration, exploitation, and production of reservoirs located in

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2. *See generally* Treaty on Maritime Boundaries, U.S.–Mex., May 4, 1978, 17 I.L.M. 1073 [hereinafter Treaty on Maritime Boundaries] (failing to mention such reservoirs).

3. Dabney Welsh, *Access to Our Backyard: A Final Resolution to the Western Gulf of Mexico Maritime Boundaries*, 23 HOUS. J. INT'L L. 609, 618 (2001).

4. The continental shelf has been defined as a "gently sloping, subsea feature which extends the uplands offshore before dropping precipitously to the ocean depths. It may extend a short distance from the coast or hundreds of miles seawards. But, [according the Third United Nations Conference on the Law of the Sea, *United Nations Convention on the Law of the Sea*, Dec. 10, 1982, Montego Bay, Jam., art. 76, U.N. Doc. A/CONF.62/122.], a coastal State's continental shelf rights extend to a minimum of 200, and maximum of 350, nautical miles from the coast." Michael W. Reed, *National and International Jurisdictions and Boundaries*, *in* OCEAN AND COASTAL LAW AND POLICY 1, 9 (Donald C. Baur et al. eds., 2008).

5. *See* Welsh, *supra* note 3, at 641.

6. *See* Western Gap Treaty, *supra* note 1, art. IV.

7. *See id.* at 3–4 (applying restrictions exclusively on exploitation of the Western Gap).

deep and ultra-deep waters of the GOM.[8] The physical impediments to developing the deep-water GOM have practically disappeared, and its production is now a matter of necessity and profitability.

Moreover, the development of deep-water reservoirs of the GOM is important to the energy policies of both Mexico and the United States. Both countries urgently need prompt development and optimization of their hydrocarbons.[9] The reasons behind this necessity are unique to each country as a consequence of their own economic and political landscapes.

Domestic production of oil and natural gas in the United States has been declining since 1970 as a result of the fact that proven domestic reserves of oil and natural gas are being consumed much faster than new significant sources are being discovered.[10] This situation has worsened during the last few decades, resulting in the United States becoming more and more dependent on importing oil from other countries. Specifically, the United States has relied on Canada, Mexico, Venezuela, Nigeria, Saudi Arabia, and Iraq, among others, for the importation of oil.[11] Because some of these oil-exporting countries are unstable or unfriendly to U.S. interests, President

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8. *See* Mineral Mgmt. Serv., Deep-Water Gulf of Mexico 2008: America's Offshore Energy Future 3 (2008), *available at* http://www.gomr.mms.gov/PDFs/2008/2008-013.pdf [hereinafter MMS] (defining deep and ultra-deep water).

9. *See* John Holmes, *End the Moratorium: The Timor Gap Treaty as a Model for the Complete Resolution of the Western Gap in the Gulf of Mexico*, 35 VAND. J. TRANSNAT'L L. 925, 935 (2002) (describing the motivations behind U.S. and Mexican actions to settle the Western Gap boundary dispute).

10. *See* Gary C. Bryner, *Challenges in Developing a Diverse Domestic Energy Portfolio: Integrating Energy and Climate Policy in the Western United States*, 15 N.Y.U. ENVTL. L.J. 73, 78–79 (2007).

11. According to a report of the Energy Information Administration (EIA), the top sources of U.S. crude oil imports for Aug. 2009 were Canada (2.007 million barrels per day), Mexico (1.057 million barrels per day), Venezuela (1.007 million barrels per day), Nigeria (0.877 million barrels per day), Saudi Arabia (0.745 million barrels per day), Iraq (0.500 million barrels per day), Algeria (0.404 million barrels per day), Angola (0.352 million barrels per day), Brazil (0.269 million barrels per day), and Colombia (0.260 million barrels per day). Crude Oil and Total Petroleum Imports Top 15 Countries, http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/company_level_imports/current/import.html (last visited Jan. 31, 2010).

Obama's Administration has announced that the United States should explore ways to reduce foreign imports.[12]

In contrast, Mexico is relatively stable, and it closely cooperates with the United States on policy issues.[13] Similar to many oil-producing countries, however, Mexico greatly depends on the profits obtained from petroleum production.[14] Funds from the state-owned oil company, *Petróleos Mexicanos* (Pemex), represent more than forty percent of the federal budget of Mexico.[15] Most of the oil produced by Mexico is exported to the United States.[16] Since 2000, the Cantarell Reservoir has accounted for more than fifty percent of Mexico's oil production, and in that same period, more than eighty percent of the oil produced has gone to the United States.[17]

However, Mexico's principal producing reservoirs, such as Cantarell, are declining,[18] and although Mexico has a huge number of potential reservoirs, some have not even been explored due to a lack of capital and technology to produce those reserves.[19]

For both countries, the preservation and optimal use of hydrocarbons, including those located in transboundary reservoirs, are matters of priority and necessity. However, the development of transboundary reservoirs concerns not just one country; it involves different states' interests, each with its own distinct domestic issues.

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12. *See* President Barack Obama, Remarks at Nellis Air Force Base (May 27, 2009), *available at* http://www.gpoaccess.gov/presdocs/2009/DCPD-200900407.htm.

13. *See* Patrick W. Martin, *Comparative Analysis of U.S. vs. Mexican Commercial Real Estate Transactions (With Tax Considerations Commentary)*, 7 L. & BUS. REV. AM. 507, 509 (2001).

14. Jude Clemente, *Aboveground Constraints May Limit Mexico's Oil-Production*, OIL & GAS J., Dec. 15, 2008, at 18.

15. *Id.*

16. *Id.*

17. *Id.*

18. Commentators have noted an irreversible decline in productive capacity in Mexico's Cantarell Field, and there is a broad consensus that Mexican oil production levels are at serious risk. Pemex officials believe that Cantarell production will decline at about fourteen percent annually in the coming years. *Id.*

19. *See id.*

The purpose of this Comment is to analyze some of the difficulties that the United States and Mexico must overcome in order to develop their transboundary reservoirs in an efficient manner, and to provide recommendations to that end.

Part I of this Comment will cover the general notion of transboundary reservoirs, and the implication for the countries involved. Part II will explain the current situation between the United States and Mexico regarding their maritime boundaries in the GOM. Part III will discuss actual development of exploration and exploitation activities for oil and natural gas in the GOM and the potential of these resources. As a backdrop of any agreement that could be negotiated between the United States and Mexico for the development of their transboundary reservoirs in the GOM, Parts IV and V will discuss the energy legislation in Mexico and the impact of recent legal reforms. Parts IV and V will also examine the basic principles of United States law regarding the ownership and development of hydrocarbons. Part VI will examine the international law of transboundary reservoirs. Part VII will review the approaches taken by other countries regarding the development of their common resources. Finally, Part VIII will suggest solutions for the joint development of resources shared by the United States and Mexico in the GOM.

II. TRANSBOUNDARY RESERVOIRS AND MAIN CONCERNS THAT ARISE

Transboundary reservoirs can be defined as reservoirs[20] or deposits that lie across a boundary line between two or more countries, which can be found in both onshore and offshore territories.[21] Common deposits that extend across international

20. A reservoir is "a subsurface, porous, permeable rock body in which oil and/or gas has accumulated. Most reservoir rocks are limestones, dolomites, sandstones, or a combination. The three basic types of hydrocarbon reservoirs are oil, gas, and condensate." PETROLEUM EXTENSION SERVICE, THE UNIVERSITY OF TEXAS AT AUSTIN, A DICTIONARY FOR THE PETROLEUM INDUSTRY 228 (1st ed. 1991).

21. *See* Western Gap Treaty, *supra* note 1, art. IV (defining "transboundary reservoirs" as they pertain to the Western Gap as "petroleum or natural gas reservoirs that may extend across the [U.S.–Mexico boundary as previously defined in the Treaty]").

borders have increasingly attracted attention in the international law arena during recent decades due to all of the implications inherent in the exploration, exploitation, and production of common resources.[22]

The presence of transboundary reservoirs has been a source of discussion and dispute between countries. Such discussions have focused on the exploration, exploitation, and production of resources contained in those reservoirs. There are several examples in this regard: the North Sea Continental Shelf cases; the Iceland/Norway Conciliation-Recommendation on the continental shelf area between Iceland and Jan Mayen Island; the U.K./France arbitration; the Greece/Turkey Aegean Sea Continental Shelf case; the Tunisia/Libya Continental Shelf case; the Australia/Indonesia seabed case; and the Eritrea/Yemen tribunal phase II decision.[23]

Several key issues regarding transboundary reservoirs most concern the countries that know or presume that some of its resources are shared with another country. Some of these issues include the following:

- What are the international and domestic rules that govern transboundary reservoirs? If fewer than all the countries sharing common deposits are exploiting those deposits, are they taking resources that belong to another sovereign nation, and, if so, is that a violation of a country's sovereign right? Is there any restraint that can be imposed against the country that is unilaterally exploiting and producing the common deposit? What rights accrue to the country that owns a part of the shared resources but that is not currently producing it?
- Are all the countries sharing common deposits able to produce those resources at the same time, or does one of the countries have the right to first production of those resources? If one country has the economic resources and

22. Rainer Lagoni, *Oil and Gas Deposits Across National Frontiers*, 73 AM. J. INT'L L. 215, 215 (1979).

23. *See generally* Ana E. Bastida et al., *Cross-Border Unitization and Joint Development Agreements: An International Law Perspective*, 29 HOUS. J. INT'L L. 356, 381–91 (2007) (reviewing the facts in dispute in these cases).

technology to exploit and produce those common deposits, and the other does not, how will the production and costs be shared?

These are some of the questions that have caused most concern to the countries that have experienced these situations.

In view of this, some countries have mutually agreed upon a way to manage their common deposits in order to avoid the problems caused by disagreement regarding their development. For instance, in 2003, Venezuela and Trinidad & Tobago agreed in a memorandum of understanding to unitize their cross-border fields.[24] In other cases, the countries facing the issue of transboundary reservoirs submitted their differences to arbitration or to the International Court of Justice in order to find a solution.[25]

In the majority of cases, disagreements arise because boundary limits between two or more countries have not been defined, or because some areas of those boundaries are in dispute. In other cases, there is a potential dispute because both countries have delineated their boundaries with knowledge of the possibility that valuable mineral resources lie across the delimitation line, or worse, that one country is able to exploit a reservoir that is located in the territory of a neighboring country by using advanced technology.

The biggest concern for Mexico involves the reservoirs located in the GOM that lie across or are in proximity to Mexico's maritime boundary with the United States.

III. CURRENT UNITED STATES–MEXICO MARITIME BOUNDARIES IN THE GOM

Mexico and the United States have delimited all of their common boundaries, a process that started with the signing of the Treaty of Guadalupe-Hidalgo following the U.S.-Mexican War in 1848, and which demarcated the land boundaries between the two countries.[26]

In 1976, the Mexican Congress amended Article 27 of its

24. *Id.* at 398.

25. *See generally id*. at 381–91 (examining several analogous cases).

26. *See* Welsh, *supra* note 3, at 615.

1917 Constitution to establish an exclusive economic zone of 200 nautical miles, as well as to provide that Mexico would exercise control over the area located outside its territorial sea and adjacent to the exclusive economic zone.[27] Even though Mexico's demarcation was deemed by the United States as generally consistent with U.S. interests, in 1976 a diplomatic negotiation began between the countries to clarify their maritime boundaries in the GOM where the boundaries claimed by each country overlapped.[28]

An agreement was reached on May 4, 1978, and both countries signed the Treaty on Maritime Boundaries.[29] The new maritime delimitation "was based on methodology from a previous treaty that created a twelve nautical mile boundary,"[30] which was a "simplified equidistant line . . . giving full effect to islands."[31]

The Treaty on Maritime Boundaries was ratified by Mexico shortly after its signing; however, it took the United States almost twenty years to ratify the treaty because questions were raised regarding the potential presence of oil and natural gas deposits in the deepest part of the GOM.[32] On October 23, 1997, the United States Senate ratified the Treaty on Maritime Boundaries, due partly to Mexican pressures that negotiations on issues related to the exploration and exploitation of the natural resources located in the GOM could advance.[33] Mexico began pressuring the United States to ratify the treaty because of concerns that deep-water drilling near the boundary

27. Holmes, *supra* note 9, at 932.

28. *Id.* at 933 (citing Jorge A. Vargas, *The Gulf of Mexico: A Binational Lake Shared by The United States and Mexico*, 9 TRANSNAT'L LAW. 459, 462 (1996)).

29. Treaty on Maritime Boundaries, *supra* note 2.

30. Holmes, *supra* note 9, at 933. This Treaty was signed between the United States and Mexico in 1970, and entered into force in 1972. It established a twelve nautical mile maritime boundary off of the Pacific coast and the mouth of the Rio Grande into the GOM. Treaty to Resolve Pending Boundary Differences and Maintain the Rio Grande and Colorado River as the International Boundary, U.S.–Mex., art. V, Dec. 21, 1970, 23 U.S.T. 371; *see infra* at fig. 1.

31. Holmes, *supra* note 9, at 933.

32. Welsh, *supra* note 3, at 617–18.

33. *Id.* at 620–21.

threatened to drain reserves that properly belonged to Mexico.[34] The Treaty on Maritime Boundaries entered into force on November 13, 1997.[35]

The Treaty on Maritime Boundaries establishes almost all the maritime boundaries between Mexico and the United States in the GOM; however, because the maritime boundary lines set by the 1978 Treaty did not extend further than 200 nautical miles from the base line, approximately 4.5 million acres of seabed in the GOM were not designated to fall under the jurisdiction of either country.[36] This area became known as "the Western Gap" or the "Doughnut Hole."[37] The Treaty on Maritime Boundaries demarcated U.S. and Mexican boundaries with respect to the continental shelf, but did not mention anything in relation to the natural resources existing therein.[38]

In 1998, the United States and Mexico reinitiated discussions to delimit the so-called "Western Gap," and on June 9, 2000, a new treaty, the Treaty Between the Government of the United States of America and the Government of the United Mexican States on the Delimitation of the Continental Shelf in the Western Gulf of Mexico Beyond 200 Nautical Miles (Western Gap Treaty), was signed.[39]

34. Holmes, *supra* note 9, at 934 (citing Nick Anderson, *Mexico Fears U.S. Drillers Will Siphon Off Its Oil*, SAN DIEGO UNION-TRIB., Mar. 31, 1996, at I2).

35. Welsh, *supra* note 3, at 621.

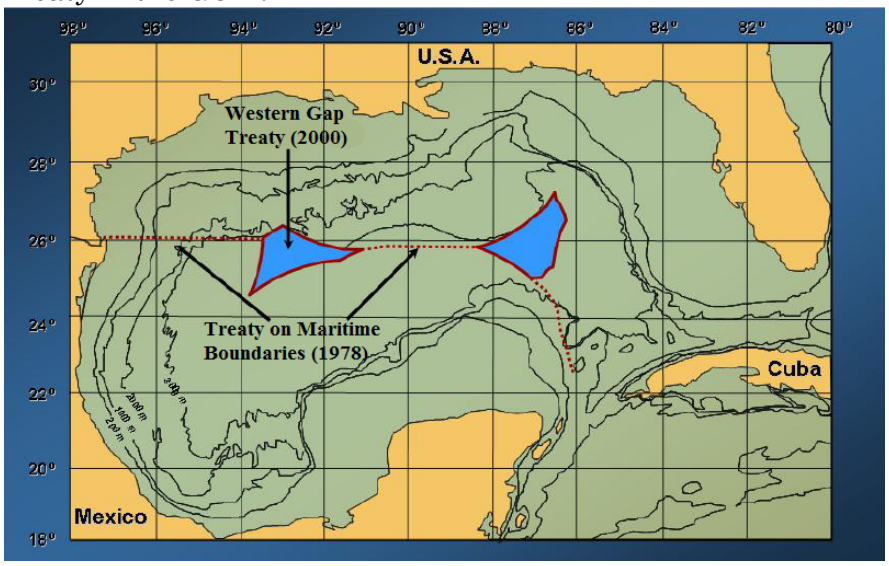
36. *Id.* at 612.

37. *Id.*

38. *See* Treaty on Maritime Boundaries, *supra* note 2, art. III ("The sole purpose of this Treaty is to establish the location of the maritime boundaries between the United States of America and the United Mexican States.").

39. *See infra* at fig. 1; Welsh, *supra* note 3, at 641; Western Gap Treaty, *supra* note 1.

Fig. 1. Treaty on Maritime Boundaries and Western Gap Treaty in the GOM.



Source: Pemex[40]

The accord employed an equidistant method as the basis for the demarcation of clear borders, and gave the United States 1,913 square nautical miles, or about thirty-eight percent of the Western Gap, while Mexico received 3,179 square nautical miles, which represent approximately sixty-two percent of the Western Gap.[41]

This new treaty contains mineral deposit clauses[42] that set the rights and duties of the parties in view of the presence (or possible presence) of transboundary reservoirs. It calls for cooperation between both countries in the exchange of information of the area, and establishes a buffer zone of 1.4

40. Pemex, *Foro Sobre Seguridad Energética* (June 18, 2007), http://www.senado.gob.mx/comisiones/LX/energia/content/foros/docs/carlos_morales.pdf (last visited Jan. 31, 2010).

41. Holmes, *supra* note 9, at 938–39 (citing Jerry Greenberg, *Data Ready When Gap Close*, EXPLORER, Oct. 2000, *available at* http://www.aapg.org/explorer/2000/10oct/western_gap.cfm).

42. *See infra* text accompanying note 216 (defining "mineral deposit clauses").

nautical miles on each side of the boundary. In this buffer zone, neither country is able to authorize drilling or exploiting hydrocarbons for a period of ten years after the agreement enters into force.[43] The buffer zone was considered to provide greater than a 99.9% assurance that neither party drills or produces any petroleum that is contained in a transboundary reservoir.[44]

The Western Gap Treaty entered into force on January 17, 2001,[45] and therefore, the moratorium in the exploitation of the resources located in the buffer zone will expire on January 17, 2011, unless both parties decide to shorten or extend the date by mutual agreement.[46]

According to the Treaty, both parties agree to share information regarding the existence of transboundary reservoirs and will attempt to reach an agreement for the efficient and equitable exploitation of those reservoirs.[47] At the end of the moratorium, each country will inform the other about its decision to exploit the area located in the buffer zone.[48]

In contrast, the Treaty of Maritime Boundaries did not include any mineral deposit clauses,[49] and therefore, there is no moratorium regarding the exploration, exploitation, and production of any reservoir outside the Western Gap, nor any express obligation of the countries to exchange information and cooperate in the development of the areas surrounding their maritime boundaries in the GOM.

This situation creates a dual regime for the development of reservoirs located near the maritime boundaries in the GOM.

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43. Western Gap Treaty, *supra* note 1, art. IV.1.

44. Welsh, *supra* note 3, at 651–52.

45. The Western Gap Treaty entered into force on the date of exchange of ratification instruments between both signing countries. Western Gap Treaty, *supra* note 1, art. IX. Though the United States and Mexico signed the Western Gap Treaty on June 9, 2000, the exchange of ratification instruments did not occur until Jan. 17, 2001. Welsh, *supra* note 3, at 651–52.

46. Western Gap Treaty, *supra* note 1, art. IV.3.

47. *Id.* art. V.1 (a)–(b).

48. *Id.* art. V.2 (a).

49. *See generally* Treaty on Maritime Boundaries, *supra* note 2 (delineating simple maritime boundaries).

For the area outside the Western Gap, either country, subject to the obligations imposed by international law, can exploit the resources located on its side of the boundary. However, the area encompassed by the Western Gap is subject to an expiring prohibition against the development of reservoirs.[50]

Consequently, in order to protect the rights of both countries to their common deposits and to avoid a situation in which one of the countries takes action that impairs the rights of the other, it is necessary that both countries reach an accord regarding the exploitation of their common deposits. It is not sufficient to simply extend the moratorium for exploitation within the Western Gap, or to set a moratorium for the area outside of it. Concrete rights and duties need to be established for each country for the development of resources.

The United States and Mexico are urged to preserve and efficiently use their hydrocarbons, and the best way to achieve this goal is through mutual agreement. Otherwise, economic and physical waste of the resources will result.

IV. EXPLORATION AND EXPLOITATION ACTIVITIES OF OIL AND NATURAL GAS IN THE GOM

The GOM is an area rich in hydrocarbons that have only been partly explored and exploited.[51] Therefore, the presence of any transboundary reservoir in the GOM should be viewed with great caution, because large quantities of valuable resources are at stake. Moreover, the issue of transboundary reservoirs becomes more delicate when the countries involved differ in expertise and economic capacity to develop these resources, as is the case with the United States and Mexico.

In this sense, it is important to examine the stage of development of exploration and exploitation in the GOM, the technical and financial capabilities of both countries to assume any cooperative development agreement of their transboundary reservoirs, and the political will of both countries to undertake this agreement.

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50. *See infra* Part IV.

51. *See* Welsh, *supra* note 3, at 612 (explaining that the Western Gap "contains what geologists believe could be the world's fourth largest oil field").

According to the latest relevant publication of the Minerals Management Service (MMS),[52] the GOM deep-water appears to have sufficient potential for development, investment, and expectation of future energy supply.

In this regard, the report concludes that:

> [t]he deepwater GOM will play an important part in the Nation's future energy supply. A large inventory of active deepwater leases is available to the industry for exploration . . . [and n]ew technology is also advancing to facilitate ultra-deepwater activities. Likewise, growth in deepwater infrastructure will occur. All of these factors will ensure that the deepwater GOM will remain one of the world's premier oil and gas basins.[53]

In the GOM there are shallow waters, deep-waters, and ultra-deep waters. The shallow waters are areas of relatively easy access for exploration, exploitation, and production due to the fact that they require less advanced technology, infrastructure, and investment in order to be developed.[54] "The threshold separating shallow and deep-water can range from 656- to 1,500-ft (200- to 457-m) in depth."[55] Furthermore, the MMS defines deep-water as "water depths greater than or equal to 1,000 ft (305 m)."[56] Likewise, "ultra-deep water is defined as water depths greater than or equal to 5,000 ft (1,524 m)."[57]

In recent years, the deep-waters of the GOM have contributed major additions to the total reserves in the Gulf, while at the same time the reserves in the shallow waters of the GOM have declined.[58] "Between 1975 and 1983, the majority of these additions were from discoveries in slightly more than

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52. The Minerals Management Service is part of the U.S. Department of the Interior and "is a responsible steward of U.S. offshore resources by ensuring the receipt of fair market value for the sale of leases, encouraging conservation, evaluating and approving new technology, and regulating the drilling and production of fields in ever-deepening water depths." MMS, *supra* note 8, at xiii.

53. *Id*. at 78.

54. *See* NaturalGas.org, Offshore Drilling, http://www.naturalgas.org/naturalgas/extraction_offshore.asp (last visited Jan. 31, 2010).

55. MMS, *supra* note 8, at 3.

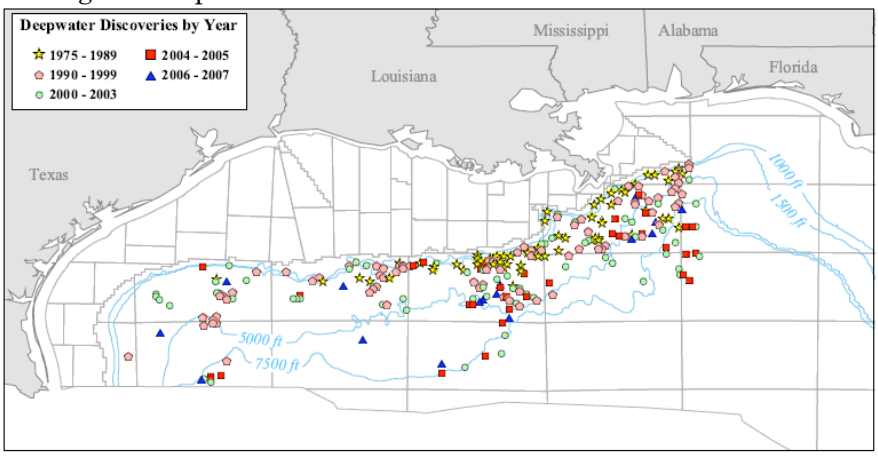
56. *Id.*

57. *Id.*

58. *Id.* at 58.

1,000 ft (305 m) of water [, and i]t was not until 1985 that major additions came from water depths greater than 1,500 ft (457 m)."[59] Significant proved reserves[60] were added from 1998 to 2001 "in the 5,000-to 7,499-ft (1,524- to 2,286-m) water depth range [, and] 2002 saw the first substantial addition from water depths greater than 7,500 ft (2,286 m)."[61]

Fig. 2. Deep-water discoveries in U.S. side of the GOM.



Source: Mineral Management Service.[62]

On the U.S. side of the GOM, deep-water development is constantly evolving and expanding, and "over the last sixteen years, leasing, drilling, and production [has] moved steadily into deeper waters."[63] "There are approximately 7,443 active leases on the GOM Outer Continental Shelf . . . , [of which 54] percent . . . are in deep-water [, and the production in these

59. *Id.*

60. "Proved reserves are those quantities of hydrocarbons that can be estimated with reasonable certainty to be commercially recoverable from known reservoirs." *Id.* at 3. "These reserves have been drilled and evaluated and are generally in a producing or soon-to-be producing field." *Id.*

61. MMS, *supra* note 8, at 58. Figure 41 illustrates the increase of proved and unproved reserves for each water-deep category from 1965–2007. *Id.* at 59; *see infra* fig. 2.

62. MMS, *supra* note 8, at 14.

63. *Id.* at 4.

waters] rose about 820 percent, and . . . deep-water gas production increased about 1,155 percent from 1992 to 2006."[64]

Deep-water operations face significant challenges, because in addition to being subject to environmental considerations, they are "very expensive and often require significant amounts of time between the initial exploration and [initial] production."[65] However, the United States has overcome these obstacles with production in several deep-water areas and currently plans to produce others.[66]

In the U.S. GOM, the development of projects in deep-waters and ultra-deep waters has been possible through the collaboration between different oil companies.[67] The companies' sharing of technology and operational skills has enabled current production in deep-waters of the U.S. GOM to reach about a million barrels a day, after approximately twenty years of work.[68]

In contrast, Mexico has been unable to develop its reservoirs located in deep-waters of the GOM because it lacks state-of-the-art technology, trained personnel, and the capital to undertake such exploration and exploitation.[69]

From 2002 to 2008, Pemex acquired seismic tridimensional data for 45,200 square kilometers in deep-waters.[70] These data revealed geological traps that can contain oil, which further resulted in the identification of more than 200 exploratory opportunities.[71] During this period, six exploration wells were completed (just over one per year), two of which were unproductive, and only one of which (Lakach) has sufficient

64. *Id.*

65. *Id.* at 14.

66. *See id.*

67. SECRETARÍA DE ENERGÍA DE MÉXICO (SENER), DIAGNOSTICO: SITUACIÓN PEMEX 69 (2008), *available at* http://www.pemex.com/files/content/situacionpemex.pdf [hereinafter SITUACIÓN PEMEX].

68. *Id.*

69. *See id.* at 7.

70. *Id.* at 66.

71. *Id.*

reserves to allow for commercial operation and development of the surrounding area.[72]

Mexico is faced with a challenge in the areas adjacent not only to the United States, but also to Cuba.[73] Cuba has been identified as possibly containing 13.5 billion barrels of crude oil equivalent in its deep-water deposits (water 2000 to 4000 meters deep), many of which are near the border with Mexico, and could begin production in 2012.[74] Likewise, exploratory activity in the GOM began more than fifteen years ago, and currently the United States produces almost a million barrels of crude oil per day, a process that involves the participation of more than thirty operators.[75]

As mentioned before, in the GOM, excluding the portion encompassed by the Western Gap, Mexico and the United States lack agreements regarding transboundary reservoirs, nor do they have a moratorium on the exploitation of the resources.[76] This situation is extremely important because there have been discoveries of formations outside of the Western Gap that potentially contain valuable hydrocarbons.

Seismic analyses have shown that in deep-waters off of the northwestern GOM lies a formation, "the *Perdido* fold belt," which contains some of the largest known areas of structural closure in the U.S. GOM waters.[77] "Most of the [*Perdido*] fold belt is in Mexican waters, but nearly 3,000 km^2 of the fold belt

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72. *Id.*

73. SITUACIÓN PEMEX, *supra* note 67, at 73.

74. *Id.* "To develop the reserves in deep-waters in the southeast Cuban GOM, Cuba divided the area into fifty-nine blocks, and [s]ince 2001, Repsol (Spain), StatoilHydro (Norway), ONGC (India), Sherrit (Canada) Petronas (Malaysia), PDVSA (Venezuela) and Petrovietnam (Vietnam) have engaged in exploration activities in twenty-four deep-water blocks in Cuban GOM." *Id.* at 30 (Author's translation). "On January 15th, 2008, the President of Brazil, Luiz Inacio Lula da Silva, met with Cuban authorities to sign an agreement by which Petrobras will evaluate and explore some blocks in Cuban GOM . . . ." *Id*. (Author's translation).

75. *Id.* at 73.

76. *See* Richard J. McLaughlin, Abstract, *Panel on The Western Gap and Transboundary Resources in The Ultra-Deepwaters of the Gulf of Mexico, Law of The Sea Institute Conference*, Corpus Christi, Tex. (Mar. 2007).

77. Joseph C. Fiduck et al., *The Perdido Fold Belt, Northwestern Deep Gulf of Mexico, Part 2: Seismic Stratigraphy and Petroleum Systems*, 83 AAPG BULLETIN 578, 578–80 (1999), *available at* http://geology.mines.edu/faculty/btrudgil/Fiduketal1999.pdf.

lie in U.S. waters within the Alaminos Canyon['s] (AC)" outer continental shelf.[78] The *Perdido* fold belt rests in water depths of approximately 7,546 to 9,843 feet and because of its petroleum potential—recognized since the early 1980—it holds the world-record for water depth exploration test (7,619 feet).[79]

According to geological and geophysical analysis, transboundary reservoirs in the *Perdido* fold belt are present, and because of the characteristics of porosity and permeability, as well as the type of hydrocarbons found there, it is highly probable that the exploitation of reservoirs on the U.S. side of the GOM affects the hydraulic behavior of the reservoirs.[80]

The *Perdido* fold belt has attracted a lot of interest from the oil companies on the U.S. side of the GOM, and between 1996 and 1997, several leases acquired by oil companies covered almost the entire *Perdido* fold belt and much of the adjacent allochthonous salt.[81] It is expected that the *Perdido* Regional Host facility will begin producing in 2010, and will develop the Great White, Tobago, and Silvertip Fields in the Alaminos Canyon.[82]

According to Pemex, the Great White-Silvertip fields do not extend to the Mexican side of the GOM; however, the Hammerhead–Magnanimo (2,420 m) and the Trident–Alaminos (2,850 m) fields extend forward into Mexican territories.[83]

78. *Id.* at 578.

79. *Id.* at 580.

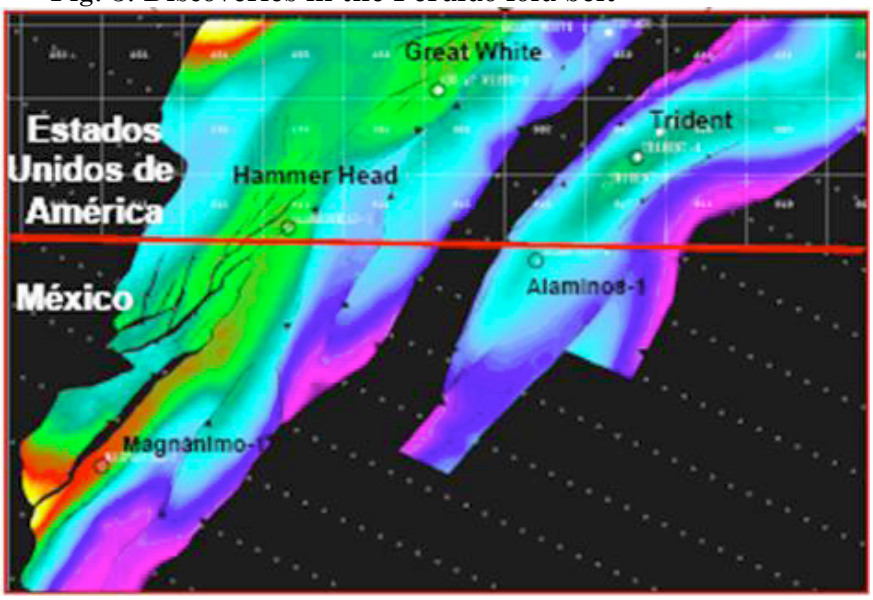
80. Pemex, *Yacimientos Transfronterizos: Negociación, Exploración y Explotación* 6, *available at* http://www.pemex.com/files/content/di_trasnsfronterizos_aop_080605.pdf (last visited Jan. 31, 2010).

81. Fiduck, *supra* note 77, at 580.

82. MMS, *supra* note 8, at 52; *see infra* fig. 3; Pemex, *supra* note 80, at 6.

83. Pemex, *supra* note 80, at 5.

Fig. 3. Discoveries in the Perdido fold belt



Source: Sener.[84]

In view of this, Mexico is primarily concerned with reservoirs located outside the Western Gap, and more specifically, those located in the *Perdido* fold belt. Nonetheless, it is only a matter of time until the Western Gap is made available for exploitation and production by both countries, which will create the same issues for the Western Gap faced by other areas of the GOM.

The principal challenges that Pemex faces with regard to deep-water production include: (i) human resources; (ii) exploration; (iii) exploitation; (iv) technology; and (v) financing.[85] These challenges will have to be assumed in the short term because Mexico's oil production is decreasing, and Pemex has estimated that fifty-five percent of the country's 54 billion

84. *Id.* at 6.

85. Pemex, *Eventos y Presentaciones, Sala de Prensa, Aguas Profunda*, http://www.pemex.com/index.cfm?action=news&sectionID=8&catID=11300&contentID=17758 (last visited Jan. 31, 2010).

barrels of equivalent oil from prospective resources[86] is located in deep-waters.[87]

Currently, Mexico cannot compete with the United States with regard to the development of the resources in the GOM, for it has not yet progressed beyond the stage of exploration.

In order to strengthen Pemex's financial and technical capacities and provide it with more flexibility for the performance of its functions, Mexico began reforming its energy legislation.[88] This process ended in November 2008. However, the last legislative reform does not endow Pemex with the capital and technology necessary to undertake the activities of exploration and production of deep-waters in the GOM.[89]

The issue of transboundary reservoirs has attracted the attention of Mexican lawmakers, politicians, and economists, among others.[90] Most of them advise taking prompt action to protect Mexico's rights to its resources.[91] Moreover, the exploitation of the resources located in the GOM will be a way for Mexico to increase its levels of petroleum production.

To summarize, in the GOM (i) there are formations, like the *Perdido* fold belt, that cross the maritime boundary of Mexico and the United States, and that will enable production as early as 2010, (ii) substantial exploration activity has already been conducted by the United States, (iii) large areas have been leased by the United States for exploitation, while others are currently being exploited, (iv) Mexico has not achieved the levels of resource development that the United States has achieved,

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86. Prospective resources are the estimated amount of hydrocarbon deposits that are not yet discovered, but are estimated as potentially recoverable. ADDAX PETROLEUM, PROSPECTIVE OIL RESOURCES, http://www.addaxpetroleum.com/_media/2009/Prospective%20Oil%20Resources.pdf (last visited Jan. 31, 2009). The quantification is based on geologic and geophysics studies.

87. Pemex, *supra* note 85.

88. *See* SITUACIÓN PEMEX, *supra* note 67, at 121.

89. See *infra* Part IV for a detailed analysis of Mexico's current energy legislation and the impact of the last reform in this matter.

90. *See generally* Press Release, Pemex, Urge Reyes Heroles a No "Cancelare el Futuro a Pemex," (Apr. 4, 2008), *available at* http://www.pemex.com/index.cfm?action=content&sectionID=134&catID=11760&contentID=17875 (discussing the opinion of Pemex's general director, a former economist).

91. *See id.*

and (v) both countries need to take advantage of the production of their hydrocarbons in the short term.[92]

In light of these circumstances, with the aim of protecting the rights of both countries and optimizing the use of resources, it would be appropriate for Mexico and the United States to cooperate in the development of their transboundary reservoirs. This cooperation will maximize economic benefits, avoid physical waste, increase energy security, and avoid international disputes likely to arise if the United States initiates production of the transboundary reservoirs. Cooperation has led to beneficial results among other countries that have faced similar dilemmas.

V. ENERGY LEGISLATION IN MEXICO AND THE IMPACT OF THE NEW ENERGY REFORM IN THE SECTOR

Transboundary reservoirs require special treatment by the countries that share them. The management of transboundary reservoirs should not be left to the whim of each party because any action taken by one party will affect the rights of the other party.

Therefore, the most appropriate measure to take in order to preserve the rights of countries with regard to transboundary reservoirs is to negotiate the rights and duties of neighboring countries regarding the exploration, exploitation, and production of common resources. The goal of these negotiations should be to establish a legal and operational framework that will govern the development of shared resources.

To that end, it is important to examine the strengths and weaknesses of the countries involved, as well as the legal framework which will serve as the bases for any negotiations. Therefore, this Part will analyze Mexican energy legislation and its oil industry situation in order to set the parameters within which Mexico will approach the issue of transboundary reservoirs.

In Mexico, as in the majority of the oil producing countries,[93]

92. *See infra* Part III.

93. In a few countries, as in the United States, it is possible that individuals own the mineral, oil, and gas under their lands. *See* John C. Peck & Burke W. Griggs,

the State is the owner of the natural resources located within its borders, including those at the surface, subsurface, and within the country's continental shelf.[94] The Political Constitution of the Mexican United States of 1917 (Mexican Constitution) expressly declares that, in the case of "petroleum, and solid, liquid, or gaseous hydrocarbons no concessions or contracts will be granted nor may those that have been granted continue, and the Nation shall carry out the exploitation of these products, in accordance with the provisions indicated in the respective regulatory law."[95]

This has not always been the rule. Before the enactment of the 1917 Mexican Constitution, the Mining Law of 1884 held petroleum and natural gas to be the "exclusive property of the owner of the soil," and that ownership of mining property was considered "irrevocable and perpetual" by the Mining Law of 1892.[96] Oil companies' rights over minerals were similar to the common law concept of fee simple ownership.[97]

Since the Mexican Revolution and the long reign of Porfirio Diaz ended, many changes have occurred.[98] In 1917, the new constitution established "that direct ownership (*dominio directo*) of all natural resources, such as solid, liquid, or gaseous

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Groundwater Law and Management: The Asia (IWMI)–Kansas Program, 41 CREIGHTON L. REV. 315, 339–40 n.75 (2008) (tracing the rule of capture from America to India); Sheila McNulty, Politics of Oil Seen As Threat To Supplies, FIN. TIMES, May 9, 2007, *available at* http://www.ft.com/cms/s/0/dd44e336-fe6a-11db-bdc7-000b5df10621.html?nclick_check=1.

94. Article 27 of the Political Constitution of the Mexican United States of 1917 provides that

> In the Nation is vested the direct ownership of all natural resources of the continental shelf and the submarine shelf of the islands; of all minerals or substances, which in veins, ledges, masses or ore pockets, form deposits of a nature distinct from the components of the earth itself . . . petroleum and all solid, liquid, and gaseous hydrocarbons . . . . [O]wnership by the Nation is inalienable and imprescriptible . . . .

CONSTITUCIÓN POLÍTICA DE LOS ESTADOS UNIDOS MEXICANOS, *as amended*, Diario Oficial de la Federación [D.O.], 5 Febrero de 1917 (Mex.) [hereinafter MEXICAN CONSTITUTION].

95. *Id.*

96. Ernest E. Smith & John S. Dzienkowski, *A Fifty-Year Perspective on World Petroleum Arrangements*, 24 TEX. INT'L L.J. 13, 23–24 (1989).

97. *Id.* at 24.

98. *Id.* at 27.

hydrocarbons, whose character is distinct from the components of the soil, [is] vested in the nation."[99] This document caused many disputes between the government and the oil companies that refused to recognize the retroactive effect of this provision, and in 1938 such disagreements led to the expropriation of the oil companies.[100] This situation provoked an international boycott of Mexican oil by the affected international oil companies; as a result, Mexico's position in the world oil market declined for the next twenty-five years.[101]

Because of these circumstances, a national sentiment against foreign interference in the Mexican economy rose, and since that time the Mexican government has made several efforts to maintain absolute control over the country's mineral resources and their development.[102]

In 1958, the Mexican Congress enacted the Regulatory Law of Constitutional Article 27 in the Field of Petroleum (the Regulatory Law)[103] in order to regulate all activities related to the exploration, exploitation, production, processing, transportation, storage, distribution, and marketing of the oil and natural gas of Mexico.[104]

Since the expropriation of the international oil companies' interest in Mexican territories, Pemex, the Mexican national oil company and its subsidiaries, have been in charge of all those activities. Under the current legislation, international oil companies cannot participate in the development of the country's natural resources through concessions, production sharing agreements, or risk service contracts, methods which are very common in the petroleum industry.[105]

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99. *Id.* at 28.

100. *Id.* at 29.

101. *Id.* at 29–30.

102. It is important to understand the history mineral resources in Mexico in order to understand why there has been a rejection against any foreign interference in this arena. For a detailed explanation of the early concession of oil in Mexico and an evaluation of its evolution, see generally *id.*

103. Ley Reglamentaria del Artículo 27 Constitucional en el Ramo del Petróleo [Constitutional Article 27, Regulatory Law in the Petroleum Branch] Diario Oficial de la Federación [D.O.], 29 de Noviembre de 1958 (Mex.) [hereinafter Regulatory Law].

104. *See generally id.*

105. *See generally id.*

Articles 3 and 4 of the Regulatory Law establish that the State will exclusively handle the exploration, production, refining, distribution, and marketing of its petroleum, and any products refined therefrom, through Pemex and its subsidiaries.[106] However, as an exception to these rigid rules, Article 6 of the Regulatory Law authorizes Pemex and its subsidiaries to contract with natural or legal persons for the procurement of service contracts, the payment for which will always be in cash, thus never granting ownership of any hydrocarbon to a private contractor.[107]

The Regulatory Law stresses that neither Pemex nor its subsidiaries may sign any contract that allows for a percentage of oil production, or the value of the sale of the hydrocarbons or its derivates, as a method of payment, nor to sign any agreement that jeopardizes the profits of Pemex.[108] Thus, under Mexican energy legislation, concessions, production sharing agreements, and risk service contracts are forbidden.

The most recent Mexican energy reform was approved on November 28, 2008.[109] Its goals were to allow private participation in the Mexican oil industry in order to reverse the decline in crude oil production.[110]

This reform was seen as an opportunity to create a flexible legal framework that provides Pemex with the tools necessary to obtain capital, financing, and the technology necessary to undertake development of new projects. Some initial proposals contemplated allowing Pemex and foreign companies to sign risk service contracts[111] or service contracts with incentives. Neither

106. *Id.* arts. 3–4.

107. *Id.* art. 6.

108. *Id.*

109. *See generally id.*

110. *Reforma a Pemex, Beneficios en 3 Años*, CNNEXPANSIÓN.COM, Oct. 29, 2008, http://www.cnnexpansion.com/economia/2008/10/29/reforma-a-pemex-beneficios-en-3-anos.

[112] Ernest E. Smith, *Service Contracts, Technology Transfers, and Related Issues*, *in* INTERNATIONAL PETROLEUM TRANSACTION 479, 507–08 (Rocky Mountain Mineral Law Foundation 2d ed. 2000) (stating that the risk service contract, commonly used in Latin America, allows a foreign company to explore, develop, and produce oil, while the host country avoids any limitations on the foreign ownership of oil resources and production. This kind of contract generally provides that the foreign company explores a determined

proposal was accepted,[112] and Pemex retains its monopoly as the only entity authorized to explore, exploit, and produce hydrocarbons located on Mexican soil.

Nevertheless, small steps were taken in order to provide Pemex with more capability to work with private companies. For example, the Statutory Law for Pemex,[113] enacted as part of the Energy Reform of 2008, now allows Pemex to grant additional benefits to companies that provide it with services, but only when:

i. Pemex obtains benefits because the work completed by the contractor was done in less time than the contract calls for;
ii. Pemex appropriates, or benefits from, new technologies provided by the contractor; or
iii. any other time the contractor provides additional profits with better resulting service to Pemex.[114]

Service contracts with performance rewards could afford Pemex some flexibility in attracting private participation to develop new exploration and production projects in the deep-waters of the GOM. In any event, it is necessary to investigate how these provisions will be interpreted and applied in order to assess the desirability of private investment.

Additionally, the Energy Reform also restructures the organization and management of Pemex, allowing more flexibility to execute service contracts not limited by federal public works laws.[115] Moreover, the Energy Reform establishes a

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area at its own risk; if a commercial oil reserve is found, the foreign company usually continues to develop the field, and is reimbursed for its investment and services; otherwise, the foreign company assumes all costs without any right to reimbursement. There is usually a provision allowing payment in cash, but sometimes it allows the right to purchase a portion of the oil produced. This type of contract allows a private company to get larger rewards for the services provided).

112. *See generally* SITUACIÓN PEMEX, *supra* note 67 (concluding that Pemex has not signed any contracts with foreign companies since it still maintains its monopoly).

113. Ley de Petróleos Mexicanos [Law of the Mexican Petroleum's], Diario Oficial de la Federación [D.O.], 28 de Noviembre de 1958 (Mex.) [hereinafter Statutory Law for Pemex].

114. *Id.* art. 61.

115. *See generally id.*

new tax regime for Pemex, so that it can retain more of its own capital.[116]

The 2008 Energy Reform is actually an internal reform of Pemex, rather than a comprehensive reform of the energy sector, and the reform's success or failure will be evaluated by the private sector's response to Pemex's proposals. However, the basic framework for hydrocarbon development in Mexico remains within the Regulatory Law of 1958.[117]

Two leading experts conclude that if Mexico conducts "business as usual," it will fail to meet its oil production goals.[118] George Baker, publisher of *Mexico Energy Intelligence*, suggests that Pemex should associate with technologically sophisticated international oil companies.[119] Similarly, Davis Shields, an independent analyst and author of several books on Pemex, opines that Pemex must focus on exploration in order to balance its emphasis on production, and states that Pemex needs to systematically refurbish and expand its facilities along the entire energy supply chain.[120]

Currently, Mexican oil production is in decline, and reversing this trend is not an easy task. Some of the barriers that Mexico faces "are not below ground but rather from the human conditions of politics, economics, regulations, and a hesitancy to proceed."[121]

Mexico's lack of investment in the exploration and exploitation of its deep-water and ultra-deep water deposits is due to the following reasons:

- Pemex's economic and technical resources are limited, and therefore their use should be optimized by placing them in the most profitable projects, such as with Cantarell and Chicontepec in Mexico.

  Since 1997, crude oil production from Pemex has come largely from the exploitation of Cantarell super-giant

116. *See generally id.*
117. *See generally id.*
118. Clemente, *supra* note 14, at 18.
119. *Id.*
120. *Id.*
121. *Id.*

offshore fields in shallow water GOM, which peaked to a maximum of 2.125 million barrels per day in 2004.122 Similarly, in the Chicontepec Field, the onshore area corresponding to the Chicontepec Pleoncanal or Tertiary Gulf Oil (ATG), is estimated to have generated an output ranging from 600,000 to 800,000 barrels per day for the past twenty years.123

The high output of these two fields has resulted in Pemex's money being diverted to their exploration, exploitation, and production. There was not as great of a necessity to develop new technology and invest in areas of high risk in the GOM as exists in deep-water GOM.124 However, in 2005, Cantarell's production began to steadily decline, and in 2007, its production was approximately 1.47 million barrels per day.125 As a consequence, Mexico's oil production has declined, and measures need to be taken in order to reverse this situation.

Because the price of oil rose to approximately $140 per barrel from 2003 to 2008, Mexico did not feel the impact of the decline of its production, for the profits generated by the current production were sufficient to maintain the budgetary requirements of Mexico.126 However, now that the price of oil has dropped considerably, the impact of the decline in production will become obvious.

- Lack of long-term planning by the institutions responsible for allocating money to Pemex, which deprived Pemex of the ability to develop GOM deep-waters.

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122. SITUACIÓN PEMEX, *supra* note 67, at 8.

123. *Id.* at 53.

124. *Id.* at 70–72 (stating that the challenges presented by GOM deep-water development include higher drilling time (200 against 120 days per well), higher costs (at least an additional $100 million per well), higher distances for drilling (over ten times the total number of meters drilled), and the least amount of exploratory success (Cantarell is close to 90%, while in deep water is estimated to be around 15%)).

125. *Id.* at 8.

126. SITUACIÓN PEMEX, *supra* note 67, at 10.

> It is well-known that for more than fifteen years, the United States has been conducting exploration and exploitation activities in the GOM (and more recently in the Perdido fold belt), and that the moratorium established by the Western Gap Treaty expires in 2011.127
>
> Both events are well acknowledged by Mexico. Proper planning would have allowed Pemex to account for the necessary resources and to begin negotiations with the United States regarding the development of the common resources.
>
> Intellectual isolation of Pemex with respect to offshore development operations and new technology.
>
> • Pemex's intellectual isolation is apparent from its absence at important events such as the Offshore Technology Conference (OTC), which focuses on major advances in offshore technology production.128

Pemex faces not only financial, but also operational, technological, and executory challenges that require greater efficiency in the management of investments, operations, and corporate management in addition to the alignment of objectives towards maximizing value.[129] Pemex also needs to manage and incorporate technology and promote appropriate training for its employees, both of which necessarily require adjustments in the company's regulatory framework.[130]

In view of these challenges and of the need to improve Mexico's oil production, Pemex has resorted to so-called "service contracts" or "multiservice contracts," contracts by which private companies provide specific services for Pemex for a fixed cost or fee, but never a share in production.[131]

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127. Diego Cevallos, *Oil-Mexico: Floundering in Deep Waters*, INTER PRESS SERVICE NEWS AGENCY (Mar. 28, 2009), *available at* http://ipsnews.net/print.asp?idnews=41776.

128. Clemente, *supra* note 14.

129. SITUACIÓN PEMEX, *supra* note 67, at 7.

130. *See id.*

131. BUSINESS NEWS AMERICAS, *Pemex to Call for First Multiple Service Contracts Nov.*, June 11, 2002, http://www.bnamericas.com/news/oilandgas/Pemex_to_call_for_first_multiple_service_contracts_Nov.

Service contracts are the only type of agreement available to foreign companies based in countries where the mineral rights are restricted to government ministries and state-owned companies.[132] Service contracts are agreements by which a company agrees to perform certain services. For instance, performing geophysical exploration, drilling a well, and operating a well for payment all constitute possible services a company could perform.[133] This type of contract is not very attractive to international oil companies, mainly because the company gets paid a fee for the services offered, but does not receive a right to obtain a share of the production.

Mexico started using this type of contract five years ago in its gas fields, but its success has been spotty.[134] It has been reported that:

> [t]he contracts failed to attract a lot of interest as most big companies balked at the terms. Some contracts were eventually issued, but all hasn't gone well. Spanish oil giant Repsol is currently trying to get out of its gas contract with Mexico because the contract is not paying off . . . .[135]

According to some analysts, large companies are not willing to invest in this type of contract because they need to devote scarce resources, manpower, and technologies for very little in return.[136]

Critics even say that service contracts are unconstitutional because in utilizing them Pemex is granting permits for the exploration and production of its hydrocarbons, activities which the constitution reserves exclusively for Pemex and its subsidiaries.[137] However, this is the only tool that allows Mexico

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132. Smith, *supra* note 112, at 479.

133. *Id*. at 480**.**

134. John Lyons & Neil King Jr., *Mexico Allure to Big Oil Uncertain*, WALL ST. J., Apr. 10, 2008, at A10, *available at* http://online.wsj.com/article/SB120778561570103339.html.

135. *Id.*

136. *Id.* (citing George Baker, a Houston-based oil analyst).

137. *Fox Administration Proposes Innovative & Controversial Plan to Attract Investment into Natural Gas Sector*, SOURCEMEX, June 26, 2002, http://ladb.unm.edu/sourcemex/sample.php3.

to obtain foreign investment and technology.

The Energy Reform would have been a good opportunity to create greater flexibility to explore and produce oil and natural gas, especially in areas near the country's maritime boundaries, which in return would have allowed Mexico to improve its exploitation and production capacity and therefore stand on equal footing with the United States. This would have prevented some inevitable problems in the future.

It is important to keep in mind that "a country that isolates itself from all foreign participation in mineral developments deprives itself of access both to capital and to new technology. It may find itself unable adequately to explore or develop its resources," and this has been illustrated by the history of the former Soviet Union and its successor republics.[138]

The only provisions of the Regulatory Law of 1958 that refer to transboundary reservoirs include: (i) Article 1, which defines transboundary reservoirs as reservoirs that are within the national jurisdiction and have physical continuity outside of it, and also those reservoirs outside the national jurisdiction but shared with other countries in conformity with treaties of which Mexico is a part, or according to the United Nations Convention of the Law of the Sea; and (ii) Article 2, which provides that transboundary reservoirs can be exploited according to the terms set out in treaties signed by the President on behalf of Mexico and ratified by the Senate.[139] Article 2 was added in 2008 as the latest amendment to the Regulatory Law, reflecting Mexico's awareness of the need to find solutions to the exploitation of its transboundary reservoirs.[140]

Nevertheless, how should these transboundary provisions be understood? Does it mean that Mexico can negotiate a cross-border unitization agreement with the United States,[141] which, for example, will provide that a common operator (not necessarily Pemex) may exploit the resources shared by both countries? Does Article 2 of the Regulatory Law allow, at least in

138. Smith, *supra* note 112, at 502.

139. Regulatory Law, *supra* note 103, arts. 1–2.

140. *Id.* art. 2.

141. *See infra* Part VII (showing the features of this contract and its benefits).

the case of transboundary reservoirs, for the suppression of constitutional constraints? If a treaty signed by Mexico has constitutional character, can this treaty contradict constitutional provisions?

According to the Mexican Constitution, "[the] Constitution, the laws of the Congress of the Union that emanate therefrom, and all treaties that have been made and shall be made in accordance therewith by the President of the Republic, with the approval of the Senate, shall be the supreme law of the whole Union."[142] Thus, any and all treaties signed by the President and approved by the Senate shall be in accordance with the rules and principles established in the Mexican Constitution.[143]

Therefore, even though Article 2 of the Regulatory Law allows Mexico to sign treaties with other countries for the development of transboundary reservoirs, those treaties must be in compliance with the Mexican Constitution, according to which Mexican hydrocarbons can only be explored, exploited, produced, refined, and commercialized by Mexico and through Pemex.

Mexican constitutional constraints limit the flexibility required for the most efficient development of joint resources, which is usually done by Joint Development Agreements or Cross-Border Unitization Agreements. As will be seen in Part - VII, these types of contracts require that parties agree on the manner in which a common deposit will be developed, usually providing that the deposit will be developed jointly by a common operator. Moreover, the parties share in the cost and profits of the resources in accordance with the allocation of the resources.

In this light, the lack of clear regulations for managing transboundary reservoirs in Mexico leads to instability and uncertainty with regard to future development of common deposits.

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142. MEXICAN CONSTITUTION, *supra* note 94, art. 133.

143. This interpretation has the support of the Supreme Court of Mexico, which has said that international treaties are hierarchically above federal laws but below the federal constitution. *See* Panel #7: Alternative Dispute Resolution As Applied To International Trade and Investment, 25 ARIZ. J. INT'L & COMP. L. 411, 431 (2008).

VI. OIL AND GAS LEGISLATION IN THE UNITED STATES

Now that the Mexican energy legislation and the current situation of the Mexican oil industry has been analyzed, it is necessary to review the structure, principles, and rules that govern the exploration, exploitation, and production of oil and natural gas in the United States, and the practices followed by the U.S. oil industry.

This review will illustrate the differences between the United States and Mexico in managing their hydrocarbons. The differences will become major obstacles to joint development of the resources shared in the GOM by both countries.

In the United States exists a mixed system of ownership of oil and natural gas in place. In some states, onshore oil and natural gas belong to individuals, which can include the owner of the surface,[144] while in other states the oil and natural gas belong to the state government.[145] On the other hand, offshore oil and natural gas generally belong to the federal government and are administered through the Mineral Management Service.[146]

Accordingly, in all of the cases mentioned above and without regard to the owner of the hydrocarbons, private participation is allowed in order to explore, exploit, and produce oil or natural gas, and the role of the State is to administer the use of these resources through regulatory and fiscal instruments.

Under government regulation that encourages competition, the American oil industry has evolved in accordance with the

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144. *See* Owen Anderson, *Introduction*, ENTREPRENEUR, Winter 2007, *available at* http://www.entrepreneur.com/tradejournals/article/163153335_1.html (stating that the U.S. rule of capture allows each individual owner to recover a share of the available oil).

145. Emeka Duruigbo, *The Global Energy Challenge and Nigeria's Emergence as a Major Gas Power: Promise, Peril, or Paradox of Plenty?*, 21 Geo. Int'l Envtl. L. Rev. 395, 442 (2009).

146. MMS, Offshore Energy Minerals Management, http://www.mms.gov/offshore/ (last visited Jan. 31, 2010); *see also* Reed, *supra* note 4, at 11 (stating that it is possible that various states have concurring jurisdiction with the federal government because inland water (which is not limited to the bodies of water that form part of the coastline, e.g., rivers that flow into the sea, bays, ports, and tidal waters) is entirely within the boundaries of the states, and thus state laws apply there, unless they are preempted by federal law. Additionally, state boundaries also extend offshore, and in most cases extend three miles from the coast).

challenges faced by it.[147] Thus, the oil companies may choose to merge or partner or ally amongst themselves in order to speed up the process of incorporating technology and experience and reduce costs.[148]

There are two main types of companies in the American oil industry: "large multinational, highly vertically integrated companies, and independent companies that specialize in one aspect of the industry."[149]

In the United States, the oil industry began in 1859 with the discovery of oil in Pennsylvania,[150] and by the 1870s and 1880s, the United States was exporting 50% of its oil to Europe, thereby making oil the U.S.'s fourth largest export.[151]

However, beginning early in the 20th century, the United States imported more oil than it exported.[152] Currently, the United States is the third-largest oil producing country, after Saudi Arabia and Russia, but it still has to import sixty-five percent of the 20.7 million barrels of oil it consumes every day.[153]

Thus, even though the oil industry began in the United States, the country's influence in the industry has diminished as a consequence of its oil production decline.[154] This means that the United States is faced with a problem of strategic subordination to other oil producing countries. Therefore, the challenges for the United States are first "to gain more control of the forces driving the United States' increased dependency on oil, especially foreign oil, and second, to take decisive action to significantly reduce its dependency on oil as a major source of energy within the shortest possible time."[155]

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147. SITUACIÓN PEMEX, *supra* note 67, at 30.

148. *Id.* at 30–31.

149. ANDREW S. GROVE ET AL., U.S. DEPENDENCE ON OIL IN 2008: FACTS, FIGURES AND CONTEXT 7 (Aug. 2008), *available at* http://ssrn.com/abstract=1327152.

150. *Id.*

151. *Id.* (citing M. Yeomans, OIL: ANATOMY OF AN INDUSTRY (2004)).

152. *Id.*

153. *Id.* at 7–8.

154. *Id.* at 22.

155. *Id.* at 4.

In order to overcome both obstacles, the United States has announced its energy policy goals of promoting alternative energy sources and maximizing the use of actual reserves. For example, in July 2008, former President George W. Bush lifted the executive offshore oil ban that was implemented in 1990 by his father, President George H.W. Bush, after the Exxon Valdez oil spill.[156] According to the U.S. Department of the Interior, this measure would give oil companies access to about nineteen billion barrels of oil located in federal waters off the Pacific and Atlantic Coast and in the GOM,[157] which in turn would increase the oil supply and therefore lower the price of gasoline in the United States.[158]

As a matter of basic principles for developing oil and natural gas in the United States, the rule of capture has been unanimously recognized.[159] According to this rule, if a reservoir lies under land that belongs to a different owner, each owner is entitled to get as much of the oil that can be produced from wells located on his or her land (taking into consideration the regulations established by the state conservation agency), without regard to the fact that resources extracted could have originated under a neighbor's tract.[160] In this case, there is generally no obligation to compensate the neighboring tract owner for any losses caused by drainage.[161]

The rule of capture has resulted in "competitive drilling and production [of oil and natural gas] with consequent economic and physical waste, as each separate owner attempts to secure his or her 'fair share' of the underground resource by drilling more and pumping faster than his neighbor."[162] To prevent such waste, state conservation laws have promoted the use of

156. *Id.* at 11.

157. *Id.* (citing *Drilling's Lure*, N.Y. TIMES, July 15, 2008, *available at* http://www.nytimes.com/2008/07/15/opinion/15tue3.html).

158. *Id.*

159. 38 Am. Jur. 2d *Gas and Oil* § 10 (2009).

160. *Id.*

161. *Id.*

162. Jacqueline Lang Weaver & David Asmus, *Unitizing Oil and Gas Fields Around the World: A Comparative Analysis of National Laws and Private Contracts*, 28 HOUS. J. INT'L L. 4, 7 (2006), *available at* http://ssrn.com/abstract=900645.

"unitization" agreements, sometimes by compulsory processes, which allow all the owners of rights in separate tracts overlaying petroleum reservoirs to operate such reservoirs.[163]

The rule of capture and unitization agreements are unknown in Mexico because Pemex has a monopoly on all petroleum development, and no competition between operators exists. However, in the international arena, those concepts play a crucial role, so Mexico should be aware of how it could impact them. For example, if Mexico and the United States disagree on the development of the common deposits, the United States could validly use its domestic oil and gas principles in the development of the resources, so long as they first give due consideration to any relevant international law.

Thus, the next part of this Comment studies the international laws for developing transboundary reservoirs which, together with the domestic law of the United States and Mexico, will govern the development of the common deposits shared by both countries in the GOM.

VII. INTERNATIONAL LAW OF TRANSBOUNDARY RESERVOIRS

Since transboundary reservoirs are reservoirs that lie across a boundary line, as well deposits located in areas where different states have overlapping claims, the rights over those reservoirs are a matter of sovereignty and the extent a country's right to assert authority over adjacent seas is an issue of public international law that has been debated for centuries.[164]

In public international law, several sources of law can be considered in order to determine the rights and duties of the states. The sources of international law are recognized by Article 38 of the Statute of the International Court of Justice, which provides:

1. The Court, whose function is to decide in accordance with international law such disputes as are submitted to it, shall apply:

163. *Id.* at 7, 11—12.

164. Reed, *supra* note 4, at 1.

a. international conventions, whether general or particular, establishing rules expressly recognized by the contesting states;
b. international custom, as evidence of a general practice accepted as law;
c. the general principles of law recognized by civilized nations;
d. subject to the provisions of Article 59, judicial decisions and the teachings of the most highly qualified publicists of the various nations, as subsidiary means for the determination of rules of law.

2. This provision shall not prejudice the power of the Court to decide a case ex aequo et bono, if the parties agree thereto.165

Some of these sources are more determinative and persuasive than others; for instance, international conventions typically carry more weight than judicial decisions.166 Nevertheless, in the resolution of controversies and determination of the rights and duties of states, the International Court of Justice—an arbitral tribunal—and the parties themselves may resort to any of these sources of international law in order to find the most equitable solution to a dispute.

Therefore, what international law regulates the conduct of the states vis-à-vis transboundary reservoirs?

The United Nation Convention on the Law of the Sea (UNCLOS or the Convention)167 is the international treaty that recognizes and establishes the rights of the sovereigns to assert jurisdiction in maritime zones adjacent to their coasts.168 UNCLOS establishes seven different types of maritime zones,

165. Statute of the International Court of Justice art. 38, June 26, 1945, 59 Stat. 1031, U.N.T.S. 993.

166. *See id*. (stating that judicial decisions are considered "subsidiary means" for determining international law disputes as compared to international conventions).

167. Convention on the Law of the Sea, Dec. 10, 1982, 1833 U.N.T.S. 397 [hereinafter UNCLOS].

168. Reed, *supra* note 4, at 3.

and allows the coastal states to claim those zones and assert jurisdiction over certain resources and activities within them.[169]

However, although UNCLOS is the most comprehensive treaty regarding sovereign rights in maritime zones, it has not been ratified by the United States.[170]

UNCLOS is the result of the Third United Nations Convention on the Law of the Sea, which began in 1974.[171] The delegates of many countries gathered in Caracas, Venezuela, with the purpose of negotiating a comprehensive treaty that would clarify ocean-related issues that have concerned the nations during preceding years.[172] This Convention was completed eight years later, and on December 10, 1982, 119 states signed the document.[173] UNCLOS entered into effect in 1994, after sixty states ratified it.[174]

Even though the U.S played a leading role in negotiating the Convention and most of its provisions were consistent with U.S. interests, President Reagan refused to allow the U.S. delegation to sign UNCLOS because some major elements of the deep seabed mining regime were unacceptable.[175]

Despite this situation, on March 10, 1983, former President Reagan issued a proclamation establishing an exclusive economic zone for the United States, and on December 27, 1988, he issued another proclamation extending the U.S. territorial sea from three to twelve nautical miles.[176]

On October 7, 1994, former President Bill Clinton signed UNCLOS after Part XI had been revised, and he submitted it to

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169. The seven zones include internal waters, the territorial sea, contiguous zone, economic exclusive zone, continental shelf, high seas, and the "area." *See id.* at 3–11 for a definition of each of these zones.

170. Jon M. Van Dyke, *The 1982 United Nations Convention on the Law of the Sea*, *in* OCEAN AND COASTAL LAW AND POLICY 375, 376 (Donald C. Baur et al. ed., 2008).

171. *Id.* at 378.

172. *Id.*

173. *Id.*

174. *Id.* at 381.

175. *Id.* at 379.

176. Van Dyke, *supra* note 170, at 381. This proclamation was consistent with the provisions of the UNCLOS.

the Senate for advice and consent. However, ratification of the treaty has yet to be achieved.[177]

Although UNCLOS is a primary source of public international law, it is also considered as part of customary law, which a secondary source of public international law, and therefore, its precepts are binding on the United States.[178]

Customary international law, as traditionally defined, has two elements: (i) state practice, and (ii) *opinio juris*.[179] State practice is "an objective requirement that focuses on the behavior of states" in the concurrence of uniform state practice, while the second requirement, *opinio juris*, "focuses on the subjective belief of the states in question . . . and requires that a state believe itself to be bound by the customary rule in question."[180]

UNCLOS is considered to be binding customary international law for the United States because it fulfills both requirements.[181] American courts have referred to UNCLOS as reflecting customary international law, and in *U.S. v. Royal Caribbean Cruises*, the court declared that "'[a]lthough the . . . convention is currently pending ratification before the Senate, it nevertheless carries the weight of law from the date of its submission by the President to the Senate,' because such a submission 'express[es] to the international community the United States' ultimate intention to be bound by the pact.'"[182] Likewise, in *Sarei v. Rio Tinto PLC*, the court explained that because the Convention has been ratified by so many nations and signed by the United States, it "thus appears to represent the law of the nations."[183]

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177. *Id.*

178. *Id.*

179. Timothy L. Meyer & Andrew T. Guzman, *Customary International Law in the 21st Century*, in PROGRESS IN INTERNATIONAL ORGANIZATION (Rebecca Bratspies & Russell Miller eds., forthcoming); UC Berkeley Public Law Research Paper No. 984581, *available at* SSRN: http://ssrn.com/abstract=984581.

180. *Id.*

181. Van Dyke, *supra* note 173, at 381.

182. 24 F. Supp. 2d 155, 159 (D.P.R. 1997).

183. 221 F. Supp. 2d 1116, 1161–62 (C.D. Cal. 2002) (overruled by Sarei v. Rio Tinto, PLC, 487 F.3d 1193 (9th Cir. 2007) on unrelated issue); Van Dyke, *supra* note 173, at 401 n.26.

On January 13, 2009, Secretary of State Hillary Clinton affirmed that the ratification of UNCLOS will be a priority for her.[184] Therefore, although the United States has not officially ratified UNCLOS, it may be bound by its provisions because UNCLOS is recognized as customary international law.

According to UNCLOS, what are the rights and obligations of Mexico and the United States with respect to the transboundary reservoirs in the GOM? Because Mexico and the United States have delimited all of their maritime boundaries in the GOM, they do not have overlapping claims over a zone that contains common deposits; instead, all of their boundaries are set, and the concern is about the possibility that either country could exploit and produce transboundary reservoirs without the consent or joint participation of the other.[185]

In the GOM, the areas covered by both the Treaty on Maritime Boundaries and the Western Gap Treaty are considered to be a part of the continental shelf and not the "high seas" or the "area" belonging to the common heritage of mankind as defined by UNCLOS.[186] Therefore, both areas are subject to the continental shelf rules established by UNCLOS.[187]

In this context, Article 81 of UNCLOS provides that "[t]he

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184. Transcript of Hillary Clinton's Confirmation Hearing, Council on Foreign Relations, http://www.cfr.org/publication/18225/transcript_of_hillary_clintons_ confirmation_ hearing.html (last visited Jan. 31, 2010).

185. There are several reasons why these concerns arise. Even if the parties agree on how much oil and natural gas each country has in place, and how much one may take, there is always a benefit in being the first to undertake the exploitation of oil and natural gas reservoirs because the natural conditions of reservoirs make primary recovery cheaper than secondary and tertiary recovery. *See infra* Part VII.

186. UNCLOS, *supra* note 170, arts. 86 & 136 (governing the "high seas" and the "international area").

187. This has not always been the case, and for that reason the Western Gap was not included in the Treaty of Maritime Boundaries signed in 1978 by the U.S. and Mexico, which delineated the continental shelves in the GOM. *See* Welsh, *supra* note 3, at 616—22 (detailing the U.S.–Mexican negotiations that took place before and after ratification). However, after conciliation of different interpretation of UNCLOS and acknowledgement of technical and geological information, both countries agreed that their continental shelves extend beyond 200 nautical miles, therefore reaching the gap left by the Treaty of Maritime Boundaries in the western GOM. *See id.* at 626–32 (providing a detailed explanation of the countries' initial interpretation of UNCLOS and the Western Gap, with both considered to be part of their continental shelves).

coastal State shall have the exclusive right to authorize and regulate drilling on the continental shelf for all purposes."[188] Almost from the beginning of the continental shelf regime, the coastal state's sovereign rights to the exploitation of its natural resources were considered to be inherent and exclusive.[189] Thus, Article 77 of UNCLOS expressly provides that "[t]he coastal State exercises over the continental shelf sovereign rights for the purpose of exploring it and exploiting its natural resources,"[190] and these rights "are exclusive in the sense that if the coastal State does not explore the continental shelf or exploit its natural resources, no one may undertake these activities without the express consent of the coastal State."[191] Moreover, Article 77 states that "[t]he rights of the coastal State over the continental shelf do not depend on occupation, effective or notional, or on any express proclamation."[192]

Accordingly, international law assumes that the sovereign rights to explore and exploit natural resources located in the seabed and subsoil of the continental shelf are allocated among the coastal states of the world and cannot be lost because of neglect or inaction.[193] These UNCLOS provisions seem to provide that each state has independent and exclusive rights to develop its continental shelf resources without regard to other states.

However, a comprehensive reading of UNCLOS reveals an underlying principle of cooperation between the states with regard to the exploration and exploitation of common deposits.

UNCLOS establishes that in pending agreements regarding the delimitation of either the exclusive economic zone or the continental shelf, "the States concerned, ***in a spirit of understanding and cooperation***, shall make every effort to enter into provisional arrangements of a practical nature and,

188. *See supra* note 4 and accompanying text.

189. David M. Ong, *Joint Development of Common Offshore Oil and Gas Deposits: "Mere" State Practice or Customary International Law?*, 93 AM. J. INT'L L. 771, 774 (1999).

190. *See* UNCLOS, *supra* note 170, art. 77.

191. *Id.*

192. *Id.*

193. Ong, *supra* note 191, at 775.

during this transitional period, not to jeopardize or hamper the reaching of the final agreement."[194] This provision is specifically tailored to instances where the continental shelf has not been defined, which is not the case with Mexico and the United States.

Likewise, Article 123 of UNCLOS also calls for cooperation of the states, and requires that states bordering an enclosed or semi-enclosed sea should cooperate with each other in exercising their rights and in performing their duties under UNCLOS.[195] This provision makes no specific reference to common petroleum reservoirs; instead, it refers to the living resources of the sea and the marine environment.[196] However, the purpose of Article 123 is to promote cooperative action by the states, and such a cooperative principle may be used by analogy with regard to the development of common petroleum reservoirs.[197]

Finally, within the spirit of cooperation between the states, Article 142 of UNCLOS provides that the activities in the "Area"[198] "shall be conducted with due regard to the rights and legitimate interests of any coastal State across whose jurisdiction such deposits lie," and "[i]n cases where activities in the Area may result in the exploitation of resources lying within national jurisdiction, the prior consent of the coastal State concerned shall be required."[199] Thus, the provision requires prior State notification and consultation in order to avoid infringement on the rights and interests of other States.[200]

Even though these provisions of the UNCLOS call for cooperation between the states, they do not reference exploitation of common petroleum deposits that cross established maritime boundaries; instead, the provisions refer to situations where maritime boundaries have not been

194. UNCLOS, *supra* note 170, arts. 74 (3), 83 (3) (Author's emphasis).

195. *Id.* art. 123.

196. *See id.*

197. Bastida, *supra* note 23, at 377 (citing Ong, *supra* note 192, at 782).

198. According to UNCLOS the Area "means the seabed and ocean floor and subsoil . . . beyond the limits of national jurisdiction." UNCLOS, *supra* note 170, art. 1(1).

199. *Id.* art. 142.

200. Bastida, *supra* note 23, at 378.

determined, or where there is a transboundary reservoir between a state and an area belonging more generally to mankind as a whole.[201]

A strict interpretation of UNCLOS regarding the rights of the states to exploit nonliving resources of the continental shelf, such as petroleum reservoirs, could lead to the conclusion that there exists an international rule of capture, a concept which would prevail over the principle of cooperation underlying other articles of the UNCLOS.[202]

However, this conclusion can be attacked for the following reasons: (i) no international law explicitly calls for the rule of capture; (ii) the increase in bilateral state practices such as joint development agreements or unitization implies that parties are unwilling to enforce the rule of capture;[203] and (iii) the principle of preservation of unity with regard to the deposits is best achieved by joint development due to the fluid nature of hydrocarbons.[204] Moreover, reading UNCLOS as a whole, one can conclude that its purpose is to establish a legal framework within which the states will cooperate in order to define and exercise their maritime jurisdiction, as well as to determine the best use of the shared resources.

Due to the lack of specific rules regarding the rights of the states over transboundary reservoirs, there is no consensus about what rules should apply to the exploitation of reservoirs.[205] There are three possible approaches:[206]

201. *See id.* at 377.

202. Ong, *supra* note 192, at 776–77.

203. Joint development agreements and unitization agreements are common solutions that states have used in developing common deposits of hydrocarbons. *See infra* Part VII.

204. Ong, *supra* note 192, at 777–78.

205. *See* Lagoni, *supra* note 22, at 221.

206. Bastida, *supra* note 23, at 372 (citing Rainer Lagoni, *Oil and Gas Deposits Across National Frontiers*, 73 AM. J. INT'L L. 215, 219 (1979)).

1. *Application of the prior appropriation rule by which the first State to undertake extraction gets the rights to exploit the whole deposit.*

This concept is parallel to the U.S. "rule of capture." The disadvantage of this rule is that it results in competitive drilling, and consequently, in economic and physical waste of resources.

2. *Application of the rule of sovereignty over the subsoil, a principle applicable in the absence of a cooperative agreement or production sharing agreement of common deposits between States.*

Although this rule is similar in its effects to the prior appropriation rule, it rests on different arguments.[207] Because this rule would also lead to competitive drilling, special rules applicable to affected deposits should be developed.[208]

3. *Application of cooperation in order to avoid competitive drilling.*[209]

This position applies the principle of territorial sovereignty over the subsoil and obliges one state not to cause material damage to another state, and also requires the state to exchange information and consult over common deposits, which, taken together, is said to resolve the legal problem of such deposits.[210] The principal question about this position is the sustainability of the proposition that an obligation to inform and consult about common deposits in fact exists in international law.[211]

Most of state practice vis-à-vis transboundary reservoirs has consisted of bilateral agreements between neighboring states, and it is an extensive and virtually uniform practice to include mineral deposit clauses in their delimitation agreements. This

207. Lagoni, *supra* note 22, at 219–20.

208. Bastida, *supra* note 23, at 373 (citing Lagoni, *supra* note 22, at 220).

209. *Id.*

210. Lagoni, *supra* note 22, at 220 (citing Barberis, *Los Recursos Minerales Compartidos Entre Estados y El Derecho Internacional*, 8 DERECHO DE LA INTEGRACIÓN 45, 55 (1975)).

211. *Id.*

practice may lead to the creation of customary international law that requires states to cooperate in the exploration and exploitation of common deposits of hydrocarbons.[212] Usually part of a maritime boundary agreement, a mineral deposit clause provides that if a transboundary reservoir is detected, the states must take specified courses of action.[213]

However, the problem of transboundary reservoirs should not be resolved based only upon traditional principles of sovereignty over natural resources, sovereign rights, and territorial integrity; rather states are compelled, for practical and economical reasons, to cooperate in the exploration and exploitation of those resources.[214]

Currently, no binding rules or customs under international law require the joint development of transboundary reservoirs; however, there is a trend towards that end.[215] Although there is no requirement to reach a successful conclusion, there exists a general obligation to consult and negotiate with other States, including through unitization and joint development agreements.[216]

Some have argued that in the case of disagreement over the development of the transboundary reservoirs, the states concerned must exercise mutual restraint.[217] This has been supported by Article 83(3)[218] of UNCLOS, which requires states to refrain from unilateral actions that risk depriving other states of the gains they could realize by exercising their

212. *See id.* at 222.

213. Ong, *supra* note 192, at 802.

214. Lagoni, *supra* note 22, at 242–43.

215. Bastida, *supra* note 23, at 421.

216. *Id.*; *see also* HAZEL FOX ET AL., JOINT DEVELOPMENT OF OFFSHORE OIL AND GAS 33–35 (British Institute of International and Comparative Law 1989).

217. Ong, *supra* note 192, at 798 (citing William T. Onorato, *Apportionment of an International Common Petroleum Deposit*, 26 INT'L & COMP. L.Q. 324, 327 (1977); Rainer Lagoni, *Interim Measures Pending Maritime Delimitation Agreements*, 78 AM. J. INT'L L. 345, 362 (1984); Masahiro Miyoshi, *The Basic Concept of Joint Development of Hydrocarbon Resources on the Continental Shelf*, 3 INT'L J. ESTUARINE L. 1, 10 (1988)).

218. Article 83 of the UNCLOS provides that the states "shall make every effort to enter into provisional arrangements of a practical nature and, during this transitional period, not to jeopardize or hamper the reaching of the final agreement." UNCLOS, *supra* note 170, art. 83.

sovereign right of exploitation, pending resolution of conflicting claims.[219] That argument is also supported by the fact that unilateral exploitation of a transboundary reservoir inevitably affects the rights of other interested states, a practice prohibited under international law.[220]

Nevertheless, the "exercise of mutual restraint" means that if one interested state refuses to agree with the other in the exploitation of a common deposit, it will have practically a veto power over the other state or states that propose common development of the shared resources.[221] This "exercise of mutual restraint" argument lacks validity in the long term because each state has both sovereignty over its territory and also the right to territorial integrity, neither of which allows one state to impose unilateral restrictions over another in the exploration and exploitation of its own resources.

Because there is no definitive rule of international law on this matter, the most practical solution would be for interested states to cooperate in order to reach an agreement regarding the exploration, exploitation, and development of their common resources. This has been the trend followed by the majority of the states that have faced this situation. However, if negotiations are unsuccessful, each state should be allowed to independently exploit the common resources.

VIII. COMMON STRATEGIES FOR THE MANAGEMENT OF TRANSBOUNDARY RESERVOIRS

Many transboundary oil and gas reservoirs exist around the world, and many of them have been subject to agreements for joint development.[222]

In some cases, transboundary reservoirs have been found before the boundaries between countries have been drawn, while

219. Ong, *supra* note 192, at 798 (citing Miyoshi, *supra* note 220, at 10–11; *see also* Lagoni, *supra* note 220, at 366). Also, this opinion is supported by the Aegean Sea Continental Shelf case. *Id.*

220. *Id.* at 799–800.

221. *See id.* at 801.

222. *See infra* fig. 4.

in other cases, transboundary reservoirs have been found after countries have drawn their boundaries.

Fig. 4. Cross-border Unitization Agreements

Countries	Fields	Year
Australia/ Czechoslovakia	Zwernsdorf-Vysoka	1960
Germany/Holland	Groningen	1960
Malaysia/Brunei	Fairley-Baram	1974
United Kingdom/Norway	Frigg Gas Field	1976
United Kingdom/Norway	Statfjord	1979
United Kingdom/Norway	Murchison	1979
United Kingdom/Norway	Markham	1980
Nigeria/Eq. Guinea	Ekanga, Zafiro	2002
Australia/Timor East	Bayu-Undan	2003
Venezuela/Trinidad & Tobago	Plataforma Deltana	In process

Source: SENER[223]

This distinction will affect the kind of arrangement that the parties enter into because in each case, there are different factors to consider. Agreements can be divided in two categories: cross-border unitization agreements and joint development agreements (JDA).[224] While the purposes of both agreements include avoiding economic and physical waste, encouraging prompt and adequate use of the resources, and preventing future disputes, the structure of the agreements differ.

Cross-border unitization agreements are usually entered into when a reservoir underlies well-established international

223. SITUACIÓN PEMEX, *supra* note 67, at 73 tbl.3.1.33; s*ee also* Bastida, *supra* note 23, at 392–98 (detailing the North Sea Agreements and the IUA between the Government of Australia and the Government of the Democratic Republic of Timor-Leste). This is a representative list of countries and is not exhaustive.

224. *See* Weaver, *supra* note 164, at 14–15.

boundaries.[225] On the other hand, when a reservoir underlies an area that has (or had) disputed sovereignty, the trend is to enter into a JDA that allows the cooperative development of petroleum resources in that geographic area by the countries concerned, despite the fact that boundaries may not be defined.[226]

The most important differences between the contracts include the following:

1. Cross-border unitization is only required once a discovery is made, while a JDA is usually formed before any exploration occurs;
2. The area to be unitized is defined by the extent of the individual reservoir or field, whereas the JDA defines the area of disputed jurisdiction, which is generally larger than any individual reservoir or field;
3. In a cross-border unitization, the licensees prepare a single development plan and a unit operating agreement that is subject to the approval of the involved countries. In a JDA, a single body which has the authority to develop its own regulations, create fiscal terms, and manage the jointly shared jurisdiction is commonly established; and
4. In a cross-border unitization the share of production and costs of each licensee are based on each licensee's participation of the field's oil and gas in place, regardless of the physical location of the production facilities, whereas in a JDA benefits and burdens are shared between the countries and their licensees on a predefined basis and are usually evenly split.[227]

As Mexico and the United States delimited all of their maritime boundaries in the GOM prior to the confirmation of the existence of any transboundary reservoirs, their situation

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225. *Id.* at 14.

226. *Id.* at 15–16. For JDAs, it does not matter that disputes exist over sovereignty and delimitation of the boundaries because the JDA establishes a joint development zone that will be developed with the cooperation of the concerned parties. *Id.* at 15.

227. *Id.* at 14–16 (citing Ernest E. Smith, *Ownership of Mineral Rights*, *in* INTERNATIONAL PETROLEUM TRANSACTIONS at 312–21 (Rocky Mountain Mineral Law Foundation 2d ed. 2000) for the description of the features of JDA).

would fall mainly within the confines of the cross-border unitization agreement.

Cross-border unitization and the JDA are considered to be the most efficient ways to develop a field containing oil and natural gas. Some advantages of using these cooperative agreements include:

- Prevents economic waste; there is no need for competitive drilling and construction of more than the necessary facilities.
- Allows sharing of development infrastructures with the benefit of lowering the cost of production.
- Maximizes the ultimate recovery of petroleum in the field, whether during primary or enhanced production operations.
- Gives all the owners of rights in the common deposit a fair share of the production.
- Minimizes use and damage of the surface or seabed by avoiding unnecessary wells and infrastructure.[228]

Due to the nature and characteristics of cross-border unitization agreements, it is necessary to establish clear and detailed rules in order to ensure optimum operation. These agreements must cover many issues in order to avoid disputes that can arise once a commercial discovery has been made, including the rights and obligations of the parties and their operators and the applicable law.

While there is no model for cross-border unitization agreements or JDAs because each is tailored to the needs and particular circumstance of the affected countries, there are six major issues that apply equally to cross-border unitization agreements and JDAs:[229]

i. **Sharing of Resources:** This is a key element in the ongoing relationship between the states involved, and it defines the proportion of the resources allocated to each state. Some agreements are based on the

228. *Id.* at 11–12 (citing Jacqueline Lang Weaver, UNITIZATION OF OIL AND GAS FIELDS IN TEXAS: A STUDY OF LEGISLATIVE, ADMINISTRATIVE AND JUDICIAL POLICIES 3, 21–29 (1986).

229. Bastida, *supra* note 23, at 414–15.

principle of equal sharing, while other have been subject to variation. An example of variation is the Australia–Timor–Leste Timor Sea Treaty, which features a 90:10 split in favor of Timor-Leste.

ii. **Management:** The management clause protects the rights and obligations of the states involved, and it deals with the management of exploration and exploitation activities within the joint development zone. The three basic models are the joint venture model, the joint authority model, and the single state model.[230]

iii. **Applicable Law:** Since each state has its own legal system, it is necessary to establish the legal framework that will be applied within the joint development zone in matters such as the petroleum licensing regime, the fiscal regime, civil and criminal jurisdiction, health and safety, and the environment.

iv. **Operator/Position of Contractors:** The agreement needs to address the basis for licensing the area or to delegate to a body the task of selecting contractors that will undertake petroleum operation activities under specific rules.

v. **Financial Provisions:** These provisions cover the establishment of a taxation regime applicable to the operations and activities conducted in the area.

vi. **Dispute Resolution:** Usually these agreements provide for an informal dispute resolution plan between the parties before they may resort to external or third party resolution of disputes.[231]

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230. Weaver, *supra* note 163, at 415–16. The three basic models of existing JDAs include: (i) a system of compulsory joint ventures between the States and their nationals, illustrated by the 1974 Japan/South Korea Agreement; (ii) a joint authority with licensing and regulatory powers to manage the development of the joint development zone on behalf of the States, exemplified by the Malaysian/Thailand Memorandum of Understanding of 1979 and the Timor Sea Treaty between Australia and East Timor of 2002; and (iii) a system whereby one state manages the development of the joint zone on behalf of both with the other State's participation confined to revenue sharing and monitoring, as illustrated by the Qatar/Abu Dhabi Agreement of 1969. FOX, *supra* note 219, at 115.

231. *See* Weaver, *supra* note 163, at 73–98 (providing a comprehensive study of the

Cross-border unitization agreements and JDAs are the most successful solution that states have used to manage common deposits. These agreements are complex and comprehensive, and therefore require cooperation and understanding between the parties involved to lead to fruitful results. Ultimately, both parties will benefit from their agreements and anything done to the detriment of one party could risk the collapse of the whole agreement.[232]

Since cross-border unitization agreements afford so many economic and practical benefits, it would be appropriate for the United States and Mexico to overcome their differences and pursue a harmonized development of their resources in the GOM.

The need to unitize is not just based on the fact that unitization would make exploitation and production more profitable and beneficial for the parties sharing the resources, but also on the fact that unilateral exploitation of any transboundary reservoirs will affect the natural conditions of the reservoir in favor of the first party that undertakes exploitation. This change is a result of well drilling that creates a pressure difference in a reservoir and causes the hydrocarbons to move from areas of high pressure to areas of less pressure, or to areas located closely to the well drilled.[233]

This last situation is what Mexico has labeled the "*efecto popote*" or "straw effect" in the media and discussion forums.[234]

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key issues affecting unitization agreements, including the unit area, unitized substances, effect of unitization, determination of tract interest, redetermination of tract interest, unit decision making, and non-unit operations).

232. If no agreement is reached over the exploration and exploitation of common deposits, severe consequences could result, as it was the case between Iraq and Kuwait, where part of the reason for the invasion of Kuwait in 1990 was the alleged drainage by Kuwait of the reservoir that it had in common with Iraq. *See* Capt. Sean M. Condron, *Justification for Unilateral Action in Response to the Iraqi Threat: A Critical Analysis of Operation Desert Fox*, 161 MIL. L. REV. 115, 116 (1999).

233. SITUACIÓN PEMEX, *supra* note 67, at 74.

234. *See, e.g.*, *México, Usuario del Efecto Popote*, El Financiero (Mex.), Apr. 6, 2009, *available at* http://www.elfinanciero.com.mx/ElFinanciero/Portal/cfpages/contentmgr.cfm?docId=182021&docTipo=1&orderby=docid&sortby=ASC (explaining the "*efecto popote*"); *see also* Noe Cruz Serrano, *Indefensos Ante Efecto "Popote"*, EL UNIVERSAL (Mex.), Feb. 18, 2008, *available at* http://www.eluniversal.com.mx/finanzas/62759.html (quoting a Mexican official who was worried that Mexico was losing

Specifically, the United States may extract Mexico's oil applying the American rule of capture. This concern is very real because the United States has the economic and technical means to begin exploiting areas near the Mexican border in the GOM, as is the case of the *Perdido* fold belt.

In order to avoid this problem, the next Part will offer recommendations for the achievement of a cross-border unitization agreement in the GOM between the United States and Mexico and will address the undesirable consequences that follow if no agreement is reached.

IX. RECOMMENDATIONS FOR MEXICO AND THE UNITED STATES IN RELATION TO THEIR TRANSBOUNDARY RESERVOIRS

Cross-border unitization agreements are the best way to develop common oil and gas deposits that underlie a boundary line between countries. However, their success will depend on the intent and the legal framework of the countries involved. Thus, this section will analyze the interaction between the legal frameworks of Mexico and the United States in order to assess the feasibility of the common development of transboundary reservoirs. It will also propose a workable plan for the creation of a cross-border unitization agreement.

When a reservoir straddles the boundaries of two or more sovereign countries, as does the *Perdido* Fold Belt in the GOM, there is a multilayered framework of law to consider in determining whether international unitization will take place. The framework is comprised of:

i. International law, including treaties, conventions, and international customary law;
ii. National laws and regulations of the host governments, as well as contracts between the host country and the licensees, including license agreements, concession agreements, and production sharing agreements.

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oil to the "*efecto popote*" with little being done to remedy the situation).

iii. Private contracts between the licensees and interested third parties, including operating agreements and production sales contracts.[235]

At this time, there is no international law that precisely regulates the rights and obligations of states for the exploration and exploitation of their common deposits once maritime boundaries have been delimitated. As explained in Part VI, the trend is to create an obligation between countries to consult and cooperate in good faith with each other and reach an agreement regarding the exploration and exploitation of their common deposits. However, such a duty does not necessarily mean that the parties will ultimately agree to a unitization agreement or any other form of joint development.

To comply with this international obligation, the United States and Mexico will have to consult and cooperate with each other in good faith before any unilateral action can be taken to develop transboundary reservoirs. The obligation of good faith cooperation has already been recognized by both countries in the Western Gap Treaty, which requires the parties to try and reach an agreement for the efficient and equitable exploitation of transboundary reservoirs during the ten year moratorium. It also requires the parties to inform one another about any decisions to lease, license, grant concessions, or otherwise make available portions of the area for exploration or development at the end of the moratorium.[236]

The United States and Mexico have not agreed to the same obligations as set forth in The Western Gap Treaty for the other areas surrounding the maritime boundaries in the GOM. Nevertheless, because of the general international obligation to consult and cooperate, the parties should seek to do the same with regard to those other areas of the GOM where the presence of transboundary reservoirs has been confirmed.

Two possible results can follow consultation and negotiation: (i) the parties agree to jointly develop their resources through a

235. Weaver, *supra* note 164, at 9.

236. *See* Holmes, *supra* note 9, at 928. This final obligation will take effect once the moratorium provided in the treaty expires in 2011. *Id.*

cross-border unitization agreement, or (ii) the parties fail to reach an agreement. If realized, the first scenario would lead to large scale benefits for both countries because such cooperation would not only lead to the best and fairest use of the resources, but it would also help maintain a close and necessary diplomatic relationship between the two countries.

To determine what kinds of arrangements for cross-border unitization are viable between the United States and Mexico, it is necessary to examine the national law and regulations of each state. As shown above, due to the current Mexican legislation, there is limited flexibility in achieving a cross-border unitization agreement with the United States, which resultantly limits the most efficient exploitation of the common natural resources.

Under Mexican legislation, the area subject to cross-border unitization will have to be divided into two zones: one located on the Mexican side of the GOM, where Pemex will conduct all activities of exploration, exploitation and production, and the other on the U.S. side, where those activities will be performed by an operator selected by the lessees owning interests in the leases from the U.S. government. Moreover, the resources extracted from Mexico's side cannot be shared with the U.S. operators (a fundamental principle of cross-border unitization agreements) because, under the Mexican Constitution, such resources can only belong to Mexico.[237] Likewise, the benefit of selecting the best location for the drilling of the wells will be diminished due to the fact that even if the majority of the hydrocarbons of that reservoir could be efficiently extracted from one well; other considerations, such as the sharing of the resources, will impede that benefit. Secondary and tertiary oil recovery processes[238] will also be limited.

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237. Regulatory Law, *supra* note 103.

238. Secondary and tertiary oil recovery processes attempt to increase the recovery of petroleum from a reservoir above that which can be accomplished by natural pressure. ABDUS SATTER ET AL., PRACTICAL ENHANCE RESERVOIR ENGINEERING: ASSISTED WITH SIMULATION SOFTWARE 656–58 (PennWell 2008). Secondary recovery is a "process or processes involving external fluid injection that are implemented in reservoirs to attain further oil recovery following primary production; in most cases the injected fluid is water." *Id.* Tertiary recovery is a "thermal, chemical, or any other enhance oil recovery processes, implemented in reservoirs once secondary recovery methods are no longer effective and viable." *Id.*

Nevertheless, it is possible to design a modified cross-border unitization agreement that avoids some of the limitations mentioned above and yet obtains many of the same benefits as a standard unitization agreement.

Private sector participation is essential to Mexico's engagement in exploration and exploitation activities. Such participation could be possible through the use of service contracts or multi-service contracts that have sufficient performance rewards to attract foreign investors.[239] Thus, while Pemex will remain the only operator on the Mexican side of the GOM, contractors will provide Pemex with the services (including technology and trained personnel) necessary to conduct exploration and exploitation.

However, Mexico will have to offer very attractive service contracts with rewards for performance, in which fixed fees for providing a service, such as drilling one deepwater well, will have to take into consideration the special skills required for the services, the technology provided, plus substantial rewards for performance. Otherwise, Mexico will not be able to fulfill its operator obligations on its part of the transboundary reservoir. From the viewpoint of the contractor, such arrangements are very beneficial because most of the risks are borne by Pemex, a valuable fact in high risk areas such as the deep-water GOM. For example, if a contractor drills a dry hole, it will still receive compensation for the services it performed.

Some international service contracts provide, as an additional incentive, that the contractor in charge of drilling or operating has the right to buy part of the oil produced from the contract area.[240] This idea is not only very attractive to multinational oil companies, it is also beneficial to Mexico

239. Another way for Pemex to obtain the technology necessary for exploration and exploitation activities in deep-waters of the GOM—until a new energy reform is approved—is to license technology agreements and technical assistance agreements, or develop its own technology, although such development could take several years and require significant investment. *See* Clemente, *supra* note 14, at 18. However, the issue of developing transboundary reservoirs is not just a question of the availability of the technology, but also of the existence of trained personnel and sufficient capital to invest in those projects. For an explanation of licensing of technology and technical assistance agreements, see Smith, *supra* note 112, at 512.

240. Smith, *supra* note 112, at 511 (noting Iranian "buy back" service contracts).

because Pemex's refining, infrastructure, transport, distribution, and product management are deficient, and Pemex has limited operational capability to respond to the necessities of the market.[241] However, the right to purchase oil is limited by Article 60.V. of the Statutory Law, which provides that Pemex will not grant contractors any kind of preferential rights for the acquisition of oil and its derivatives.[242]

In order to create a unitization agreement, the United States and Mexico must first agree upon the areas where common deposits exist. Once this is established, both parties must agree on the allocation and apportionment of the common resources that lie under each side of the boundary. Additionally, the states must determine who will be in charge of the management and supervision of the party obligations under the cross-border unitization agreement.

The latter issue is central in order for cross-border unitization to maximize the recovery of oil and gas and share the oil fairly. Additionally, it will allow Pemex, as the operator on the Mexican side, to maintain control over the exploration, exploitation, and production of the resources in its area. For that reason, it will be necessary to include in the agreement a joint authority or management committee. This committee would protect the rights of all parties on both sides of the boundary; design plans for exploration, exploitation, and production, as well as environmental policies and dispute resolution mechanisms; and oversee and control the activities of the parties, such as production rates and well locations.[243]

If the area covered by the transboundary reservoir on the U.S. side of the GOM has already been leased to different oil companies, as in the case of the *Perdido* Fold Belt, it is nevertheless necessary for the different owners in the field to agree to a Joint Operating Agreement in which only one owner is named as the operator and thereby only one party conducts

241. SITUACIÓN PEMEX, *supra* note 67, at 83.

242. Statutory Law for Pemex, *supra* note 113, art. 60.V.

243. The designation of a management body is typical of JDAs. In the case of the U.S. and Mexico, the most suitable model is the Joint Authority because it gives Mexico direct control over the development of its resources. *See supra* note 232 and accompanying text.

exploration and exploitation in that area. This act would make it easier for the United States to interact with Mexico under a cross-border unitization agreement regarding the development of common resources.

In order to prevent the economic and physical waste of resources, the management committee should coordinate the operations of Pemex on the Mexican side with the operations of the private operator on the U.S. side. By being a member of this management committee, Mexico could greatly benefit as Pemex personnel would gain the knowledge and experience necessary to develop projects in deep-water. As such, this management committee should be composed of representatives from Pemex, the contractor or contractors performing service contracts for Pemex (who will have the ability to better assess the conditions on the Mexican side because the contractor performs the activities), and representatives of the operator from the U.S. side.

Thus far, this proposal requires two operators for an area subject to the cross-border unitization agreement. However, in practice it might be possible for the operations in the entire unitized area to be carried out by just one operator. In the case of one operator, only one company would execute the development plan on both sides of the GOM, and would thus be able to better coordinate all aspects of the operation. If the contractor selected by Pemex to perform a service or multi-service contract on the Mexican side of the GOM is the same as the operator on the U.S. side of the GOM, the problem of two operators is solved.[244]

Since the United States has planned to start production in the *Perdido* fold belt in 2010,[245] and the negotiations of a cross-border unitization agreement will probably extend past 2010, it is appropriate for the two countries to sign a pre-unitization agreement which establishes the allocation of the common resources by determining the percentage share of the cross

244. However, there is a potential problem in this approach because the existing operator on the U.S side will probably not bid to supply the service at a low rate as it would do in other situations since there is lack of competition with other operators.

245. Shell, *About Perdido*, http://www.shell.us/home/content/usa/aboutshell/strategy/major_projects/perdido/about/perdido_about.html (last visited Jan. 31, 2010).

border field that lies under Mexican and U.S. waters.[246] This agreement should also designate a mechanism for compensation if U.S. production drains Mexico's share. This pre-unitization agreement could provide, for example, for a redetermination of the allocation and apportionment of resources once a unitization agreement has been reached, or it could provide that the United States will hold Mexico's share of profits in escrow.

If a cross-border unitization agreement is not feasible after consultation and good faith negotiation, each country should be free to unilaterally manage the resources located under its respective territory, even if these resources are in transboundary reservoirs. In this case, each country will apply its own rules concerning the exploration, exploitation, and production of the mineral resources. For the United States, this means that the rule of capture will come into play.[247]

However, the application of the rule of capture will damage the close relationship between the two countries.[248] To avoid this, the United States should consider sharing production obtained from transboundary reservoirs with Mexico in accordance with the allocation of the resources and after deduction of the costs of production. Nevertheless, even if Mexico receives its fair share of the resources, it will have lost the opportunity to learn how to develop deep-water reservoirs.

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246. According to the Subsecretary of Hydrocarbons of the Sener, Mario Gabriel Budebo, the governments of Mexico and the United States will soon establish a schedule of formal meetings which will focus on achieving a treaty for the exploitation of transboundary reservoirs. Three meetings have been held so far with representatives of the United States to talk about the issue. The purpose of the agreement, among other things, will be to determine the apportionment of the resources. Noé Cruz Serrano & Notimex, *Delimitarán Frontera para Buscar Petróleo*, EL UNIVERSAL.COM.MX, Apr. 21, 2009, *available at* http://www.eluniversal.com.mx/finanzas/70414.html.

247. This rule of capture is not desirable because it causes physical waste of the resources and in the hypothetical situation that Mexico undertakes the activities of exploitation, it would also cause economic waste due to competitive drilling. *See Unocal Netherlands B.V./Continental Netherlands Oil Company*, Hoge Raad der Nederlanden [HR] [Supreme Court of the Netherlands] 14 Oktober 2005, LJN AT7537 (Neth.)

248. There is no international standard to follow with regard to the rule of capture. Not all countries recognize the rule as valid, and some countries directly oppose it. For instance, according to the Supreme Court of the Netherlands, Dutch law does not recognize the rule of capture. *Id.*

Even assuming that both parties agree on the allocation of the resources—which may be difficult if there are no appraisal wells on the Mexican side of the GOM—the country that initiates exploration and exploitation will have an advantage over the other country. For instance, primary production (or the natural drive mechanism) is generally more profitable because there is no need for enhanced oil recovery processes.[249] Thus, the problem is not just to make sure that each country receives a proportionate part of the common resources. Economic considerations enter into play in the production of the resources as well.

X. CONCLUSION

The GOM is an area rich in valuable hydrocarbons that are, in principle, available for exploitation and production to the United States and Mexico. Both countries have the rights to explore and exploit hydrocarbons located in the deep-waters of the GOM, but in the case of Mexico, there are legal, financial, and technical constraints that make their development more burdensome.

Since the United States and Mexico have resources located in transboundary reservoirs, the best way to achieve maximum benefit from the resources is through a cross-border unitization agreement.

To that end, Mexico will need to make important changes to its energy legislation, or, failing to do this, it will need to design proposals very attractive to the private sector that will allow Mexico to have access to the technology and capital needed to develop its resources in areas that were not previously at risk of being drained.

Meanwhile, the United States should not be forced to wait for Mexico to develop resources on its side of the GOM after the moratorium expires in the Western Gap, or anywhere else in the GOM, once consultation and negotiation between both parties has been concluded. Even under the current Mexican

249. Hence, if Mexico undertakes the exploration, exploitation and production of the common deposits in the long term, it would face an even more expensive production cost of its "fair share" of the common resources. *See* ABDUS SATTER, *supra* note 241.

constitutional restraints, it is still possible to jointly develop transboundary fields through a unitized development plan that coordinates all the operations on both sides of a transboundary reservoir. Therefore, there is no reason to allow Mexico to impose a unilateral restraint on the United States. Moreover, if such agreement cannot be reached, simple accounting can supplant the rule of capture and respect the rights of both Mexico and the United States, which will facilitate continued good relations between the two countries.

For Mexico, the issue of transboundary reservoirs is not limited to those reservoirs that it shares with the United States; it is very likely that Mexico faces the same issue with Cuba[250] and perhaps with Guatemala. Mexico must seriously consider its energy policies in order to protect its resources as well as successfully confront these new challenges.

Mexico and the United States are faced with challenges presented by the joint development of common resources, but such an undertaking is worthwhile for the benefit of their economies, their national interests, and their enduring friendship.

250. In Cuban territory, prospective resources consisting of 13.5 billion barrels of crude oil equivalent in its deep-water deposits have been identified, many of which are near the border with Mexico and could begin production in 2012. SITUACIÓN PEMEX, *supra* note 67, at 73. To develop the reserves in GOM deep-waters near southwest Cuba, Cuba divided the area into fifty-nine blocks, and since 2001, Repsol (Spain), StatoilHydro (Norway), ONGC (India), Sherrit (Canada) Petronas (Malaysia), PDVSA (Venezuela) and Petrovietnam (Vietnam) have engaged in exploration activities in twenty-four deep-water blocks in the Cuban GOM. On Jan. 15th, 2008, the President of Brazil, Luiz Inacio Lula da Silva, met with Cuban authorities to sign an agreement that will allow Petrobras to evaluate and explore some blocks in the Cuban GOM. *Id.* at 30, 73.