UNITIZING OIL AND GAS FIELDS AROUND THE WORLD: A COMPARATIVE ANALYSIS OF NATIONAL LAWS AND PRIVATE CONTRACTS[1]

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I. INTRODUCTION: OVERVIEW AND SCOPE OF ARTICLE

A. Introduction

Unitization is the joint, coordinated operation of a petroleum reservoir by all the owners of rights in the separate tracts overlying the reservoir.[2] Unitization of oil and gas fields is commonplace in the United States where private ownership of minerals has often resulted in fractionalized ownership of the oil and gas in a common reservoir, such that tens, hundreds, and

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2. This Article adopts the U.S. spelling of "unitization" rather than the European spelling of "unitisation" (a matter that might be of importance in computerized database searches that are unforgiving about spellings). The term "unitization" has been translated in several different ways in the various laws and regulations collected *infra* in Appendix I. Several translations use "unification;" less frequently, the rather odd term "individualization" is used.

In the United States, unitization is distinguished from pooling (although the terms are sometimes, regrettably, used interchangeably). *See* HOWARD R. WILLIAMS ET AL., WILLIAMS & MEYERS MANUAL OF OIL AND GAS TERMS 850 (12th ed., 2003) (the source most often used by U.S. lawyers for definitions of words used in the petroleum industry). Pooling is the process of combining separately owned, small tracts of land into drilling units or spacing units of the size required by a conservation commission in applications for drilling permits, for example, 40 acres for an oil well or 640 acres for a gas well. *Id.* Pooling is done to avoid unnecessary well drilling during the primary recovery phase of production. *See id.*; JACQUELINE LANG WEAVER, UNITIZATION OF OIL AND GAS FIELDS IN TEXAS: A STUDY OF LEGISLATIVE, ADMINISTRATIVE, AND JUDICIAL POLICIES 7 (1986). Each owner of land pooled into the unit well will receive a fair share of that unit well's production. WEAVER, *supra*, at 22. Unitization, by contrast, is a process of combining separately owned portions of a common producing reservoir or field into a large, fieldwide unit; in the United States, it is usually done to implement secondary recovery of oil. WILLIAMS ET AL., *supra*, at 1206. "Communitization" also has a particular meaning in the U.S. context. *Id.* at 187. It means pooling done on federally owned lands. *Id*.

even thousands, of private landowners (who have leased their tracts in exchange for royalty interests) and their lessees (working-interest owners) have interests in the same reservoir. Without unitized operation of the reservoir, the common law "rule of capture" results in competitive drilling and production 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.[3] To conserve its petroleum resources, the United States became the "unitization capital" of the world as measured by the enactment and use of domestic (in international terms "municipal") unitization laws.

Outside of the United States, unitization has not been as prevalent simply because it has not been as necessary to the sound development of petroleum resources. Oil and gas resources in most countries are owned by the country, not by private individuals or entities.[4] When a country, as the single lessor or licensor, issues licenses or enters into production sharing agreements or similar contracts with enterprises to develop these resources,[5] the contracts awarded often cover large areas comprised of many thousands of acres.[6] In addition, government agencies may have used seismic surveys to define the license area to cover an entire geological structure or other trap, thus limiting the possibility of competitive drilling by rival licensees awarded adjacent acreage over a common reservoir.[7]

Nonetheless, interest in unitization outside of the United States has been growing in the past three decades for several

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3. WEAVER, *supra* note 2, at 21.

4. The term "country" is used in preference to "state" or "nation" throughout this Article, in part to avoid confusion with references to the individual states within the United States of America.

5. In the United States, development rights are granted by an oil and gas lease, and the oil company, or grantee, is commonly called the lessee. Outside of the United States, the company granted contractual development rights by host governments is typically called the licensee, contractor, or concessionaire.

6. For example, the Turkish petroleum code authorized licenses of 123,500 acres, or 50,000 hectares. Ernest E. Smith, *Ownership of Mineral Rights*, *in* INTERNATIONAL PETROLEUM TRANSACTIONS 262 (Rocky Mountain Mineral Law Foundation 2d ed. 2000).

7. Al Hudoc & Van Penick, *British Columbia Offshore Oil and Gas Law*, 41 ALBERTA L. REV. 101, 102 (2003).

reasons. First, the 1973 OPEC oil embargo imposed by Mideastern producing nations against many of the industrialized, oil-importing countries, led to a rapid rise in the price of oil. Western nations and their multinational oil companies sought to diversify their sources of oil imports. Exploration proceeded apace in many new areas of the world, such as the North Sea, South America, and Africa, and many new companies entered the international arena to compete for development rights against the major oil companies that had long dominated the global market. Additionally, state monopolies over exploration and production in host countries were loosened in the 1980s and 1990s, so more competitors could successfully enter to engage in resource development.[8] Second, over the years, exploration blocks offered by host governments have become smaller as host governments have sought to maximize revenue through a greater number of signing bonuses and more rapid development of reservoirs (more likely if there are fewer reservoirs per block). Third, relinquished areas from existing blocks have also increased the number of smaller blocks available.[9] As a result of all of these factors, increasing numbers of reservoirs are being discovered in locations outside the United States that underlie several license areas with different licensees on each area. Some of these reservoirs cross the borders between two or more countries. In addition, as offshore areas have become the new frontier promising the highest potential for large field discoveries,[10] licensees have moved into areas with undefined boundaries contested by rival coastal

8. Sandoval Amui & Marienne L. R. Melo, *Unitization of Oil and Gas Reservoirs*, AIPN ADVISOR, May 2003, at 8 (describing Brazil's experience).

9. *Id*. at 8, 15. Brazil's new regulations dictate smaller block sizes and have created "great expectations" that unitization may occur in Brazil in the near future. *Id.*

10. Roger Knight et al., *Deep Water: How West Africa Compares with Gulf of Mexico*, OIL & GAS J., May 5, 2003, at 42 (reporting that as shallow water reserves are being steadily depleted worldwide, the major oil companies' dollars are targeted at deepwater reserves—almost U.S. $58 billion in capital expenditures on deepwater developments are forecast in 2003–2007, double the amount spent in the previous five years). Secondary recovery projects in mature, shallow water areas are also occurring. *See* Hector Igbikiowubo, *ExxonMobil Awards $1.7b Oil Recovery Contracts*, VANGUARD (Nigeria), July 10, 2003 (announcing $1.7 billion investment in oil recovery project offshore Nigeria which will also eliminate gas flaring and increase recovery by more than 500 million barrels).

nations. For all these reasons, the development of petroleum resources between different licensees and different countries through cooperative rather than competitive mechanisms has assumed great importance globally.

B. Legal Framework for Unitization: Overview

Internationally, unitization takes place within a multi-layered framework of law. When a reservoir straddles the boundaries of two or more sovereign countries, whether the boundaries are defined (often termed "delimited") or undefined, the layers look like this:

(i) international law—treaties, conventions, and international custom;

(ii) national laws and regulations of the host governments, and contracts between the host governments and the licensees, notably agreements authorizing development (such as a license agreement, concession, or production-sharing agreement). In some countries, the host-government contract has the force of law; and

(iii) private contracts among the licensees and interested third parties, such as operating agreements, farmout and acquisition agreements, and production sales contracts.

This Article examines this multi-layered legal framework from two different perspectives. Parts II and III analyze the unitization provisions of the national laws, regulations, and model contracts of a twelve-country survey[11] and describe the private framework of commonly used contracts that are affected by unitization. Parts IV and V review the unitization process, key issues addressed in a unitization agreement, and the typical treatment of those issues.

11. See further discussion *infra* subpart I.C.

C. Scope and Methodology

1. The Countries in the Survey

The focus of the twelve-country survey in Part II of this Article is the legal framework for unitization in countries without a long history of unitization because those are largely the places where new sources of petroleum are being found and produced today. Twelve petroleum-producing countries were chosen for this comparative analysis, as follows:

Angola
Azerbaijan
Brazil
China
Colombia
Ecuador
Egypt
Indonesia
Nigeria
Russia
United Kingdom
Yemen

The United Kingdom was selected for purposes of comparison as one country with an extensive history of unitization under a system of sovereign ownership of mineral rights common to most of the world, in contrast to the private ownership system that prevails in the United States. The United States is less useful as a model for comparison because regulatory jurisdiction over petroleum conservation and unitization there is largely the preserve of each separate state and its conservation commission rather than the federal government.[12]

12. For example, the state of Texas regulates almost all aspects of the production of oil and gas in Texas through its rather oddly named Railroad Commission of Texas. WEAVER, *supra* note 2, at 3. (Other states have regulatory agencies with more functional names, such as the Alaskan Oil and Gas Conservation Commission. Oil and Gas Conservation Commission Homepage, http://www.aogcc.alaska.gov (last visited Feb. 9, 2006)). The federal government of the United States does own significant petroleum resources located on the Outer Continental Shelf and leased by the Department of

2. Methodology: Twelve-Country Survey

Several sources were used to collect the legal provisions related to oil and gas unitization in the twelve countries discussed in Part II: (i) the Barrows collection of international petroleum materials, which includes laws, regulations, model contracts, and some unitization agreements that have been negotiated and signed; (ii) the PEPS database of laws, regulations, and model contract provisions from IHS Energy; and (iii) unitization agreements submitted to the authors by members of the Association of International Petroleum Negotiators (AIPN), generally in redacted form without the names of the companies involved. The relevant portions of the laws, regulations, and model contract provisions of these twelve countries are included in Appendix I of this Article.

D. Definitions

To clarify the analysis that follows, the Authors adopted standardized definitions to use throughout this Article. The definitions, with commentary, are as follows:

Unitization: Unitization is the joint, coordinated operation of an oil or gas reservoir by all the owners of rights in the separate tracts overlying the reservoir or reservoirs.[13]

Unitization is generally acknowledged as the best method of producing oil and gas efficiently and fairly, for the following reasons:

Interior through its Minerals Management Service. Minerals Management Service, About MRM, http://www.mrm.mms.gov/Intro/WhoWeAre.htm (last visited Feb. 9, 2006). Deepwater production from federal leases in the Gulf of Mexico is one of the few frontier areas left to exploit in a country with a maturing and declining reserve base. Knight et al., *supra* note 9, at 42. About thirty percent of the onshore land in the United States is also owned by the federal government, primarily in the western states. American Petroleum Institute, Why Onshore Government Lands Are Important to Meeting the Nation's Energy Needs, http://api-ep.api.org/issues/index.cfm?bitmask=002006002004000000 (last visited Feb. 9, 2006). The U.S. government has unitization regulations for both onshore and offshore petroleum reservoirs.

13. WEAVER, *supra* note 2, at 1. Whether unitization can embrace more than one reservoir is discussed *infra* subpart II.G.

- It avoids the economic waste of unnecessary well drilling and construction of related facilities that would otherwise occur under the competitive rule of capture.
- It allows sharing of development infrastructure, thus lowering the costs of production through economies of scale and operating efficiencies.
- It maximizes the ultimate recovery of petroleum from a field according to the best technical or engineering information, whether during primary production operations or enhanced recovery operations.
- It gives all owners of rights in the common reservoir a fair share of the production (in U.S. terminology, it "protects correlative rights").
- It minimizes surface use of the land and surface damages by avoiding unnecessary wells and infrastructure.[14]

Outside of the United States (and to a limited extent, in a few other jurisdictions such as Canada), the applicable country is the sole owner and licensor of the petroleum resource and will receive production shares, royalties, taxes, and other contractual benefits from all license areas.[15] Thus, even though one licensee may be draining another under the rule of capture, the country itself does not usually suffer drainage (unless the reservoir extends across national boundaries).

Nonetheless, governments outside the United States are not immune from the economic incentives for the unitization of oil and gas fields. Competitive drilling can result in unnecessary wells being drilled and unnecessary surface infrastructure being installed to prevent drainage between licensees. The "economic waste" of higher costs can ultimately lead to the physical waste

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14. *See* WEAVER, *supra* note 2, at 21–29; *see generally* STEPHEN L. MCDONALD, PETROLEUM CONSERVATION IN THE UNITED STATES: AN ECONOMIC ANALYSIS (1971) (discussing unitization specifically in chapter ten). Unitization began at the most local level in the U.S., with city ordinances designed largely to minimize drilling and surface disturbance in populated areas. *See*, *e.g.*, Marrs v. City of Oxford, 32 F.2d 134 (8th Cir.), *cert. denied*, 280 U.S. 573 (1929).

15. *See generally* Smith, *supra* note 6, at 203–337; John S. Dzienkowski, *Concessions, Production Sharing, and Participation Agreements for Developing a Country's Natural Resources*, *in* INTERNATIONAL PETROLEUM TRANSACTIONS 392–478 (Rocky Mountain Mineral Law Foundation 2d ed. 2000).

of oil or gas as the field is abandoned sooner because it is not commercially profitable in its later stages.[16] Both economic and physical waste have direct economic impacts on the country owning the resource, in the form of lower revenues from reduced ultimate recoveries and higher tax deductions or higher cost recovery by the licensee, reducing the country's share. Also, if the contractual benefits to be paid to the country by the different licensees (such as royalties, production shares, or taxes) are not identical, the country may well have a direct financial interest in preventing drainage from, say, a higher-royalty tract to a lower-royalty tract. In essence, while far fewer players will be involved in unitization outside the United States than on private lands within the United States, the motivations for unitization are quite similar in all parts of the world.

Sole-Country Unitization: Unitization which takes place wholly within one country; the reservoir does not extend beneath state borders, but it does extend underneath the boundaries of different license areas, usually with different licensees.[17]

This unitization will be governed by the laws and regulations or contract provisions (if any) of the country where the reservoir is located.[18]

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16. 2 ERNEST E. SMITH & JACQUELINE LANG WEAVER, THE TEXAS LAW OF OIL AND GAS ch. 8.3(B), at 8-37, 8-40, 8-44 (2d ed. 2005). For the distinction between economic and physical waste in the U.S. context, *see id*. at 8-37 to 8-44.

17. *See, e.g.*, Bruce M. Kramer & Gary B. Conine, *Joint Development and Operations*, *in* INTERNATIONAL PETROLEUM TRANSACTIONS 640–41 (Rocky Mountain Mineral Law Foundation 2d ed. 2000) (discussing the differences between reservoirs that lie wholly within one country and those that cross a boundary between two countries). In one instance known to Professor Weaver, a single lessee owned several adjacent blocks offshore and unitized them in order to minimize drilling wells on each block that would otherwise be required to keep each of its leases in effect. The blocks were leased from the State of Alabama. Thus, unitization may take place even when the same lessor and lessee are on both adjacent blocks, although this is not the typical scenario.

18. Note that in some joint development zones (discussed *infra* p.11), the two countries may establish a joint management body with a single set of petroleum regulations and fiscal terms, and the unitization of a reservoir that crosses a license boundary, but lies wholly within the zone, would then be analogous to a sole-country unitization.

Cross-Border Unitization: Unitization which takes place for a reservoir underlying two or more countries that have a delimited border between them. Such unitization will typically involve two or more different licensees.[19]

The following are typical attributes of cross-border unitization (to distinguish it from the joint development agreements discussed next):[20]

- Cross-border unitization is only required once a discovery is made.[21]
- The area covered by the unitization agreement is defined by the extent of the individual reservoir or field.
- The two countries collaborate (through a treaty or other international agreement) on issues related to optimum field development (including, for example, safety), but maintain their sovereign rights on each side of the border.
- The groups of licensees prepare a single development plan and a unit operating agreement, which are then subject to the approval of both countries.
- Each license group's share of production and costs is based on the proportionate share (called the participation factor) of the field's oil and gas in place underlying its license, regardless of the physical location of the production facilities. Each licensee pays its taxes and royalties in accord with the terms of its own contract as if

19. *See, e.g.*, *Venezuela, Trinidad & Tobago to Unitize Joint Gas Fields*, OIL & GAS J., Sept. 30, 2002, at 32. In some cases, the licensee of a block in one country may bid the most to secure the award of a license from a bordering country on the block adjacent to its existing license or may be recognized as a preferred bidder by the second country, thus making unitization easier to accomplish. *See id.* The latter event is reported in the Loran field straddling Venezuela and Trinidad. *See id.*

20. E-mail from James G. Ross, Senior Group Advisor, Gaffney, Cline & Associates (London), to Jacqueline Lang Weaver, A.A. White Professor of Law, University of Houston Law Center (on file with Author).

21. Indeed, some experts state that it is impossible to enter into an actual unitization agreement prior to discovery because such agreements are largely a technical matter of apportioning reserves. KEITH W. BLINN, CLAUDE DUVAL, HONORE LELEUCH, ANDRE PERTUZIO, INTERNATIONAL PETROLEUM EXPLORATION AND EXPLOITATION AGREEMENTS 213 (Barrows 1986).

its unit share of production had been produced from its own contract area.

- The legal framework maintains two separate sets of regulations and fiscal terms.[22]

Joint Development Agreement for a Joint Development Zone: An agreement between countries that authorizes the cooperative development of petroleum resources in a geographic area that has (or had) disputed sovereignty.[23]

The joint development agreement (JDA) establishes the geographic contours of a joint development zone (JDZ) within which cooperative development of petroleum occurs despite disputes over sovereignty and the delimitation of the boundary between two or more sovereigns.

The characteristics of a JDA for the cooperative development of petroleum, especially as contrasted to the cross-border unitization, include the following:

- The JDA defines the area of disputed jurisdiction and is generally much larger than any individual reservoir or field.
- The JDA is ideally formed before any exploration occurs, in order to provide a stable and cooperative investment environment for future licensees to undertake exploration and development. (However, there can be exceptions to this ideal.)
- Commonly, the JDA establishes a single body, which may have the authority to develop its own petroleum regulations and fiscal terms and to manage the jointly shared jurisdiction.

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22. *See generally* William T. Onorato, *Joint Development of Seabed Hydrocarbon Resources: An Overview of Precedents in the North Sea*, 6 ENERGY 1311, 1312–15 (1981); William T. Onorato, *Apportionment of an International Common Petroleum Deposit*, 26 INT'L & COMP. L. Q. 324, 335 (1977); Kramer & Conine, *supra* note 17, at 640–45.

23. *See* 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, 771-773. In a few cases, a JDZ has been established in conjunction with an agreement on the delimited border.

- The benefits and burdens arising from future discoveries are shared between the countries and their respective licensees on a pre-defined basis (usually, but not always, on a fifty-fifty basis).[24]

It is possible to have a reservoir crossing the boundary between a JDZ and the defined border of another country. The reservoir can then be subject to a cross-border unitization agreement between the body responsible for managing the JDZ and the country that exercises sovereign rights over the other part of the reservoir.[25]

E. Unitization: A Primer

1. The Unit Concept

Before proceeding to analyze the legal framework in depth, the following subpart briefly summarizes the effects of unitization on the lessee/licensee, first in the United States and then outside of the United States.[26] In both scenarios, the broad concept is identical: The unitized area, usually a reservoir, is treated as a single unit for development purposes. It is as if the separate leases and licenses are merged into one single lease or license, with a single unit operator appointed to manage the development of the field, within the limits of the authority granted the unit operator by the unit operating agreement and the management committee composed of all the different lessees or licensees with interests in the unit. Those readers already familiar with unitization concepts may want to proceed directly to Part II.

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24. *See* Smith, *supra* note 6, at 312–21.

25. *See, e.g.*, Timor Sea Treaty, Austl.-E. Timor, art. 9, May 20, 2002, *available at* http://www.un.org/depts/los/legislationandtreaties/pdffiles/treaties/aus-tls2002tst.pdf.

26. The short discussion presented here cannot capture many of the complexities of unitization. For example, the licensed blocks may have resulted from different bidding rounds with different minimum commitment amounts, exploration periods and deadlines; the field may actually be composed of several different producing strata; the technical problems of adjusting for different reservoir rock and fluid properties and reservoir drives may be daunting; some parties may have more knowledge about the reservoir than others, etc. See *infra* Parts IV and V for further discussion.

2. In the United States

In the United States, with its pattern of private ownership, two agreements are usually signed to unitize a field: a Unit Agreement signed between the lessors (royalty-interest owners) and lessees (working-interest owners) to create the unit; and a Unit Operating Agreement (UOA) signed only by the lessee or working-interest owners to govern the actual operation of the unit.[27] In many ways, the UOA is similar to a Joint Operating Agreement (JOA) commonly used by lessees or licensees who jointly own fractional interests in one particular lease or license. The American Petroleum Institute has promulgated model unit agreements and unit operating agreements which have been widely used in the industry as the basis of many agreements in the United States,[28] although the parties are free to add special provisions or make modifications as they see fit. Any changes, however, must not violate the dictates of the particular laws and regulations of the individual state's conservation commission if the agreements are to be approved by that commission.[29]

Almost all unitization agreements are submitted to the conservation commissions for two reasons: First, the lessees often need to invoke the state's compulsory process to force recalcitrant owners, both royalty- and working-interest owners, into the unit; and second, the approval of the conservation commission usually shields the unit participants from allegations that their cooperative activity violates antitrust laws.[30]

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27. 7 EUGENE KUNTZ, A TREATISE ON THE LAW OF OIL AND GAS §137.6, at 193 (1993); *see also* 1 BRUCE M. KRAMER & PATRICK H. MARTIN, THE LAW OF POOLING AND UNITIZATION § 17.02[4], at 17-16.2 to 17-16.3 (3d ed. 2003).

28. *See* 1 KRAMER & MARTIN, *supra* note 27, § 17.02[4], at 17-16.2 to 17-16.3 (providing copies of the API's model forms for unit agreements and unit operating agreements); *see also* David A. Guichon, Jr., *The 1992 PJVA Model Form Unit Agreement*, 31 ALBERTA L. REV. 26 (1993) (discussing the results of the Canadian oil industry's attempts to create a model form unit agreement, working with the government, in a task force that proved quite time consuming and unexpectedly difficult).

29. 1 KRAMER & MARTIN, *supra* note 27, § 17.02[1], at 17-9.

30. State conservation commission approval cannot shield companies from federal antitrust laws, but the risk of liability is quite low when the purpose of unitizing is to increase rather than restrict production. For other benefits of securing commission

In the United States, most unitization occurs many years after a field's discovery and primary production, when further production requires secondary recovery by repressuring the field with water flooding or other techniques[31] (although there are significant exceptions such as the Prudhoe Bay oil field on state-owned land in Alaska, the largest oil field in the United States, which was unitized before production began).[32] During the primary phase of production, the field is regulated by the state conservation commission through a wide variety of conservation laws, such as pooling, prorationing, well spacing, no-flare orders, and maximum gas-oil and water-oil ratios. While these conservation laws go far in assuring that physical waste of petroleum does not occur and that all interest owners are accorded fair shares of production from a common reservoir, these laws are inferior to unitization for these purposes and require more regulatory intervention than a unitized operation. Indeed, the U.S. experience with late and partial unitization is a lesson to avoid elsewhere. For example, the failure to agree to fieldwide units and the formation of only partially fieldwide units has been estimated to reduce recovery rates of original oil in place from forty-four percent to thirty-nine percent.[33]

On onshore federal lands in the United States, early unitization is sometimes practiced through laws authorizing the formation of federal exploratory units.[34] Strong arguments have

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approval, particularly in Texas where no compulsory process is available, *see* Jacqueline Lang Weaver, *The Legal Significance of Commission Approval of Unitized Oil and Gas Operations*, *in* 37 INST. ON OIL & GAS LAW & TAX'N § 4 (1986).

31. 2 SMITH & WEAVER, *supra* note 16, ch. 11-2(B), at 11-15 to 11-18. Such techniques require unitization because, otherwise, the operators that repressure the field have no way to prevent oil from moving toward the tracts and wells of those operators that have refused to pay for the considerable expense of the repressuring operation. Such owners are "free riders" and their failure to cooperate can defeat the economic and technical feasibility of secondary recovery operations that can boost recovery rates significantly. Many unitization statutes in the United States do not apply to exploratory drilling or activity, despite the benefits that can be obtained from early unitization. *See* WEAVER, *supra* note 2, at 338.

32. Prudhoe Bay Unit Operating Agreement § 37.103 (Apr. 1, 1977).

33. GARY D. LIBECAP, CONTRACTING FOR PROPERTY RIGHTS 105 (Cambridge Univ. Press 1989). This book has numerous examples of the sometimes astonishing inefficiency of U.S. practices. *Id*. at 93–106. *See also* WEAVER, *supra* note 2, at 315–36.

34. *See* D.O. Churchill, *Federal Unitization*, 21 ROCKY MTN. MIN. L. INST. 223

been advanced that compulsory exploratory unitization on private lands in the United States would enhance the economic viability of the domestic exploration and production industry, leading it to resemble international operations more closely, but politicians do not appear willing to embrace proposals to achieve more effective unitization in the United States.[35]

Almost all of the states in the United States have compulsory unitization statutes which authorize their conservation commissions to order unwilling owners to join the unit on a basis approved after notice and hearing before the commission.[36] However, the proponents of unitization must first secure voluntary agreement of a supermajority of interests (both royalty and working interests) before resort to compulsory process. In some instances, the states have such high required

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(1975). Such units allow federal lessees to consolidate large lease blocks (of 25,000 acres or more) to do exploratory drilling and development with the consent of the Secretary of the Interior. *Id.* at 223–24; Lewis C. Cox, Jr., *Unitization and Communitization*, *in* 2 LAW OF FEDERAL OIL AND GAS LEASES § 18, § 18-21 (Matthew Bender 2003). The units may include private lands, but only by voluntary agreement of the private owners. Churchill, *supra*, at 231. An initial exploratory well must be drilled within six months of unit approval, and additional development drilling to fully explore the unit, if oil or gas is discovered in paying quantities, must occur within five years. *Id.* at 236, 243. The federal government also recognizes a "Cooperative Agreement" which is an agreement to develop, operate, and produce a field in which separately owned units are independently operated without allocation of production between them. S*ee* Cox, *supra*, §18-11. Such a cooperative agreement can help to prevent physical and economic waste, but it is not as effective as unitization in securing these goals. *Id.*

35. Owen L. Anderson & Ernest E. Smith, III, *The Use of Law to Promote Domestic Exploration and Production*, *in* 50 INST. ON OIL & GAS LAW & TAX'N § 2, §2.06 (1999).

36. Perhaps surprisingly, Texas, the largest oil and gas producing state, does not have a compulsory unitization statute. Texas has a voluntary unitization statute which perversely requires the same long list of commission findings and procedures that are required by other states' compulsory acts. At the end of the hearing process, the unit participants are shielded from state antitrust liability, but the state has no power to unitize unwilling owners. For this reason, units in Texas are often only partially fieldwide; unnecessary well drilling still occurs; operating costs are higher; and correlative rights are not well protected. Politics explains the bad policy. In place of compulsory unitization, the conservation commission (Texas Railroad Commission) has used a combination of sticks and carrots to prod lessees and their lessors into unitizing, sometimes quite successfully. For a thorough account of the history, politics, and consequences of Texas' uniquely flawed approach to conservation, see WEAVER, *supra* note 2. For a shorter account, see Jacqueline Lang Weaver, *The Politics of Oil and Gas Jurisprudence: The 86% Factor*, 33 WASHBURN L. J. 492, 492–94 (1994).

percentages for voluntary agreement that unitization is still an arduous, if not impossible, task.[37]

Offshore, U.S. practice more closely resembles international practice, with some unique characteristics. Lessees often unitize at the development stage to allow rational development of very expensive prospects. It is often not feasible to separately develop two offshore blocks using two separate platforms and pipelines, given the enormous capital expenditures required. The U.S. Department of the Interior, through the Minerals Management Service division, has the authority to regulate offshore oil and gas development on federal lands. The Minerals Management Service allows voluntary unitization but can require unitization where it deems such unitization to be necessary to prevent waste, conserve natural resources, or protect correlative rights.[38] Units in the offshore United States may encompass many blocks with separate ownership by different lessees to allow use of common facilities; separate participating areas are formed to address sharing of costs and production for each reservoir that crosses lease boundaries.[39]

Once accomplished, unitization has the following important effects on the rights and duties of lessees and lessors in the United States:

- Each lessee and its royalty-interest owners receive a percentage of production from the unit as a whole, regardless of where the wells are located. Thus, if a tract

37. *See, e.g.*, Gilmore v. Oil & Gas Conservation Comm'n, 642 P.2d 773 (Wyo. 1982). In this case, eighty-one working-interest owners voted on sixty different participation formulas in an attempt to achieve the required minimum percentage of voluntary agreement to unitize. Only after analyzing computer records of the voting was a compromise formula adopted that divided production on the basis of eleven different factors. *Id.* at 775. The Wyoming Supreme Court ultimately upheld the conservation commission's approval of the unit, noting that "[a]ppellant seems to expect perfection. Justice was accomplished here, as much as could be under the circumstances. This litigation should end." *Id. at* 779–81. One study showed that negotiations to unitize seven oil fields in the United States took from four to seven years, and in five of the fields, only partial units were formed because of disagreement over the participation formula. Steven N. Wiggins & Gary B. Libecap, *Oil Field Unitization: Contractual Failure in the Presence of Imperfect Information*, 75 AMER. ECONOMIC REV. 368 (1985).

38. 30 CFR § 250.1301 (2004).

39. Cox, *supra* note 34, §§ 18-33-36, 18-38, 18-67-69. This practice is not common outside of the United States as noted *infra* at pp. 28–34; 35–36.

is used only for water injection wells and has no producing wells on it, the tract will nonetheless receive a fair share of production from the unit.

- Leases that would otherwise terminate because they have no production at all or production less than that required by the typical lease (production in paying quantities sufficient to recover operating costs after paying royalties) remain in effect as long as there is production in paying quantities from the unit.
- The unit operator is free to place wells in the most advantageous position from an engineering standpoint to maximize recovery in the field, and many conservation regulations, such as well spacing and prorationing, are relaxed for unit operations.[40]

To illustrate with a simple example, assume the West family owns the West tract of 300 acres and the East family owns the East tract of 900 acres. The West family has leased to Bigg Oil for a one-eighth royalty, and the East family has leased to Littel Oil for a one-sixth royalty. During primary recovery, the field is drilled to a density averaging one well for every forty acres. The field is then unitized under a participation formula that accords twenty-five percent of unit production to West tract (300 West acres divided by 1200 total acres in the unit) and seventy-five percent of unit production to East tract. Bigg and Littel, the working-interest owners, share the costs of unit operations under the same formula. All the wells on the West tract are converted to injection wells that drive the oil toward the East tract. Production from the unit wells on the East tract keeps both leases alive and is allocated to the respective tracts under the twenty-five to seventy-five percentage formula. Once allocated, the West lease continues to define the relationship between the West royalty owners (who will be paid a one-eighth royalty on the twenty-five percent allocated to their tract) and their lessee; similarly the East family will receive a one-sixth royalty on the unit production allocated to their tract.

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40. *See id.* § 18.03.

3. Outside the United States

Similar principles apply in international practice. When two or more groups unitize, they often sign a unitization agreement, which is essentially a "super Joint Operating Agreement" combining all of the acreage in the reservoir and defining how cooperative development will proceed among the licensees. The host country generally must approve the terms of the unitization agreement. Unitization has the following effects under the typical licensing, concession, or production sharing agreement:

- Unitized shares of production and costs are allocated to each block.
- Generally, cost recovery,[41] profit oil, and royalties continue to be calculated on a block basis, using the shares of production and costs allocated to each block. In some instances where one of the blocks is not yet licensed or is held entirely by the national oil company, unitization will be accomplished by giving the licensees from the other block rights over both blocks, perhaps at cost recovery and profit oil splits and royalty rates that vary from the splits and rates agreed under the agreement for the licensees' original block.
- Taxes, if ring-fenced[42] by block, continue to be ring-fenced but will use the shares of production and costs allocated to each block for purposes of determining income and expenditures.
- Domestic supply obligations continue to be calculated on a block basis.
- Any remaining minimum work obligations[43] continue to apply on a block basis.[44]

41. For a general discussion of cost recovery clauses in international production sharing agreements, see Dzienkowski, *supra* note 15, at 456–62.

42. "Ring-fencing" is defined as "a procedure used in tax calculation which prevents losses incurred in one area from being offset against taxable income where there is a profit." WILLIAMS ET AL., *supra* note 2, at 994.

43. For a general discussion of minimum work commitment clauses, see Dzienkowski, *supra* note 15, at 454–56.

44. David Asmus, Partner and Global Head of Oil and Gas, Baker Botts, L.L.P., PowerPoint Presentation on Unitization Issues (Sept. 26, 2002) (on file with Authors) (discussing unitization's effects on typical agreements).

Outside the United States, because unitization agreements usually involve larger prospects, bigger sums of money, and unitization at an early stage of a field's development, it is useful to think of three stages to unitization, as follows:[45]

(i) the pre-unitization agreement (entered into at the time of discovery [or appraisal] of a common reservoir, generally before commerciality is declared);

(ii) the unitization agreement (usually coincident with an agreed development plan); and

(iii) redetermination of participation factors (as specified in the unitization agreement) as more data becomes available from field development and production.[46]

Except in the case of offshore leases, redeterminations of participation shares in the United States are rare. Further, if a unit is enlarged or reduced in size or otherwise modified, no retroactive adjustments are made in the participation shares.[47]

Unitization agreements and the issues involved in negotiating them are discussed in more detail in Parts IV and V of this Article.

II. SURVEY AND ANALYSIS OF COUNTRY LAWS, REGULATIONS, AND MODEL CONTRACT PROVISIONS

This Part of the Article analyzes the laws, regulations, and model contract provisions of the twelve countries selected for this survey. After a brief overview of this legal framework, the subparts analyze the major types of issues that may arise under the different legal provisions. In all cases, the body of conservation law created by the twenty-nine different oil-producing states of the United States provides considerable

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45. Amui & Melo, *supra* note 8, at 17. (In the onshore United States, the first and third stages rarely occur.)

46. *Id*. In the U.K. North Sea, it appears that the pattern of early unitization with a retroactive adjustment of redetermined shares has resulted in significant litigation. *See A Note on Three UK Oil and Gas Unitization Cases*, 78 RESOURCES (Canadian Inst. of Resources Law Newsletter), Spring 2002, at 13–16. Redeterminations are difficult because they do not make the pie bigger but simply transfer resources in a zero sum game. *See infra* subpart V.F.

47. *See* 3 KRAMER & MARTIN, *supra* note 27, § 17.02[5][b], at 17-23 to 17-24 (explaining that the API Model Form does not allow for retroactive adjustments).

comparative experience (unfortunately, often as the end result of litigation) about the meaning of the terms and provisions found in other countries' laws.[48] Each subpart opens with a brief overview of the legal implications of the issue as found in this body of U.S. conservation law. Some host governments outside of the historic oil and gas producing areas may be confronting some of these issues for the first time.

A. Summary Overview of the Twelve-Country Comparative Analysis

The collected laws, regulations, and model contract provisions on unitization that were located for the twelve-country group, arranged alphabetically by country are contained in Appendix I. A review of the legal framework of unitization for these twelve countries results in the following summary observations, few of which would prove surprising to international lawyers who practice in the energy area:

- Most countries have enacted some type of legal provision authorizing unitization. The preferred method is to use model host-government contract provisions rather than other types of laws and regulations as the vehicle for specifying unitization rules.[49]

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48. An article by David Eckman compares the unitization statutes of twenty-nine different producing states in the United States. The table at the end of the Eckman article summarizes some key characteristics of thirty-one different unitization statutes (California and Louisiana each have two unitization statutes) and a compulsory unitization statute that was proposed and nearly enacted in Texas in 1973. David W. Eckman, *Statutory Fieldwide Oil and Gas Units: A Review for Future Agreements*, 6 NAT. RESOURCES LAW 339, 381–82 (1973). While the reader should consult each state's current laws to check for amendments, the Herculean effort by Mr. Eckman is still an excellent source of information and analysis on the U.S. domestic (or "municipal") law.

49. Model contracts are often created by administrative regulation of the licensing authority, which may be either the national oil company or a government entity (typically either the ministry in charge of natural resources or a government agency established for the purpose of regulating the exploration and production of hydrocarbons). *See, e.g., infra* Appendix I, Model Production Sharing Contract, cl. 8.8.2 (2002) (Ecuador) (PEPS), showing, for example, that in Ecuador the Ministry of Energy and Mines must approve operational agreements for unitized exploitation. However, legislative approval is sometimes required in addition to, or in place of, any administrative approvals. Of the countries surveyed in this Article, Egypt, Russia, and Yemen require legislative approval of the actual production sharing agreement, although

- Most of the countries require unitization, but compulsory process is used only after efforts at voluntary unitization have failed.
- Compared to state unitization laws in the United States and to the actual unitization agreements completed and signed, the legal provisions on unitization assembled in Appendix I are often short. Ecuador is the only country surveyed that has written a Model Unitization Agreement, reminiscent of the American Petroleum Institute's efforts to write such agreements in the United States.[50] Most of the longer provisions in Appendix I govern procedural matters, not the substantive content of the ultimate unitization agreement. Thus, a fair amount of flexibility exists in the negotiation of actual unitization agreements.

B. Absence or Existence of Unitization Provisions

As noted above, all the producing states of the United States have enacted statutes on unitization, although the statutes differ in significant ways from each other. Elsewhere, legal provisions governing unitization are common, but not universal, and the countries certainly differ widely in the degree of detail governing unitization in their legal frameworks in the following ways:

- Three of the twelve countries have substantive laws governing unitization: Azerbaijan, Brazil, and Ecuador.
- Four additional countries—Egypt, Indonesia, Nigeria and the United Kingdom—have regulations governing

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this fact is not obvious from the collected unitization provisions in Appendix I. See *infra* subpart II.L. Other, broader statutes governing mineral development require this type of approval. In Russia, there is no model production sharing agreement, but a production sharing agreement law requires legislative approval of the individual agreement if the agreement relates to (i) acreage located on the continental shelf or in Russia's exclusive economic zone and (ii) acreage for which competitive bidding was voided on the basis that no more than one bid was made. Russia 1995 Production Sharing Agreement Law Art 6.1, 6.2 (PEPS).

50. Bolivia, which is not one of the surveyed countries, recently enacted unitization regulations that are similar in length and treatment to unitization laws enacted in many U.S. states. An English translation of the Bolivian laws was kindly provided to the authors by Dario E. Arias of Petrobras Bolivia, S.A. (On file with Authors.)

unitization (the United Kingdom and Nigerian regulations are virtually identical).

- Three additional countries—Angola, China, and Colombia—have unitization provisions in their model contracts, even though they have no other laws or regulations governing unitization. Thus, a total of ten of the twelve countries have legal provisions on unitization in at least one of the three sources of law. Several of the countries have multiple sources—laws, regulations, and model contract provisions.
- Of the ten countries named directly above, six have unitization clauses in their model contracts: Angola, Brazil, China, Colombia, Ecuador, and Egypt. Egypt's provision is rather unusual in that it operates to merge two adjacent blocks experiencing drainage under the same operator for development purposes. The provision cannot rightly be called a unitization provision in the same category as the other countries' provisions, but it is unitization-related. Azerbaijan is the only country that has a law but no model contract. Clearly, model contracts are the most common source of unitization provisions.
- Two countries—Russia and Yemen—seem to have no provisions dealing with unitization in any of the source material researched.[51] Yemen, although lacking a specific unitization requirement, has a provision on conservation (in its 1992 Red Eagle Production Sharing Agreement in the Ramah Block), which requires that the contractor "take all proper measures, according to generally accepted methods in the Petroleum Industry to prevent loss or waste of Petroleum above or under the ground in any form . . . ."[52] Such a provision can be interpreted to

51. The Russian Duma is considering a new Subsoil Code which contains provisions addressing unitization. *See* Jonathan Hines, *Update on Russian Subsoil Development Regime: Situation for Foreigners Under the Present and the Draft New Law*, AIPN ADVISOR, Apr. 2005. The proposed new Subsoil Code is not expected to pass through the Duma until mid-2006. Mark Polonsky, Jennifer Josefson, and Sergei Stepanov, *Overview of Russian Oil and Gas Legislation*, AIPN ADVISOR, June 2005, at 15.

52. *Infra* Appendix I, Red Eagle Production Sharing Agreement of 1992 Between

require unitization to prevent waste (although not to protect correlative rights, which is not a listed purpose for unitizing in any of the twelve countries). Unquestionably, unitization is a proper and generally accepted measure in the industry to prevent waste. The search of the PEPS and Barrows databases did not include a systematic search for broader provisions on conservation, but to the extent that such provisions exist, unitization is arguably required when necessary to prevent waste.[53] Such a conservation provision is probably quite common in the international petroleum framework.[54]

- In three countries—Azerbaijan, Egypt, and Nigeria—the search of Barrows' source material found unitization provisions in signed development contracts, such as licenses or production sharing agreements. The actual

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the Ministry of Oil and Mineral Resources and Red Eagle Resources Corp (Ramah Block), art. 11.1 (Yemen) (Barrows Supp. No. 125, M. East) [hereinafter Yemen's PSA].

53. *See* WEAVER, *supra* note 2, at 137. In the United States, it is doubtful that the courts will interpret such a broad conservation statute as authorizing compulsory unitization without passage of a law specifically granting this right to a state conservation commission. However, outside of the United States, the conservation provision is often a contractual obligation of the licensee to the licensor country in the development contract, and it is then quite reasonable to interpret the provision as requiring the licensee to unitize. *See, e.g.*, Yemen's PSA, *supra* note 52, art. 11. Of course, the licensor country as resource owner can simply pass a law requiring unitization. Even in the United States, state conservation commissions with weak or nonexistent unitization powers have nonetheless used no-waste and no-flare orders under their conservation authority, with the ultimate effect of indirectly affecting compulsory unitization without a compulsory unitization statute. WEAVER, *supra* note 2, at 142–51. Under such orders, lessees are starkly presented with two options: Either agree to unitize or suffer seriously restricted cash flow from reduced production rates imposed by the conservation commission to prevent waste. *Id.* "Voluntary" unitization usually followed such orders fairly quickly. *Id.* at 151–54.

54. *See infra* Appendix I, Model Concession Agreement, art. XI (1998) (Egypt) (Barrows Supp. No. 124, N. Africa); Agreement Dated 19 April 1999 on the Exploration, Development and Production Sharing for the Block Including the Padar Area and the Adjacent Prospective Structures in the Azerbaijan Republic Between the State Oil Company of Azerbaijan and Kura Valley Development Company Ltd. And Socar Oil Affiliate, art. 16.2 (1999) (Azer.) (Barrows Supp. No. 44, Russia & NIS) [hereinafter Azerbaijan's Padar Area PSA]; Hydrocarbon Operations Rules, art. 52 (2002) (Ecuador) (PEPS).

contract provisions add little detail to the legal provisions already extant in these countries.[55]

- In contrast to the relatively sparse regulatory framework described above, many of the actual unitization agreements found through Barrows or collected from AIPN members are lengthy documents. For example, the unitization agreement entered into by parties developing the Caspian Sea area of Azerbaijan is well over 100 pages long. The unitization parties, through their agreement, supply much of the detail necessary to accomplish the unitization.

In sum, international practice, while generally requiring unitization, appears to allow the parties considerable flexibility in negotiating the unitization agreements under broad guidelines.

C. Circumstances Triggering Unitization

In the United States, the fractionalized pattern of private ownership of a common reservoir creates its own circumstance justifying unitization. The unitization statutes of the various states typically require a finding that persons own separate interests in a common field, a finding easily made in almost all instances.[56]

Similarly, in international practice, the universal trigger for requiring unitization is geological: A petroleum reservoir is found to extend underneath contiguous contract areas, so different parties have rights over the common reservoir[57]

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55. For example, in Egypt, the 1997 Concession Agreement with Norsk Hydro in the Ras el Hekma Area appears to have been the template for Egypt's 1998 Model Concession Agreement. *See infra* Appendix I, Model Concession Agreement (1998) (Egypt) (Barrows Supp. No. 124, N. Africa). In Nigeria, the actual contract closely tracks the Model Contract provision.

56. *See, e.g.*, TEX. NAT. RES. CODE ANN. § 101.011 (Vernon 2001).

57. Some expert commentators argue that the unitization process should start at the very moment that seismic studies indicate a common reservoir straddles two license areas. However, this seldom occurs because at this stage, little is known about the reservoir or how it should be developed and produced. Nonetheless, it is possible for the parties to sign a pre-unitization agreement which sets out some principles as the basis for a future agreement, making the subsequent negotiation of the actual unitization agreement easier. Amui & Melo, *supra* note 8, at 9.

(although the language does differ among countries, and Angola and China in particular have two triggering events, as discussed further below).

Angola *(1997 Model Production Sharing Agreement)*: Sonangol (Angola's national oil company) may require unitization under two circumstances: (i) if a commercially exploitable structure extends into another contract area with a similar unitization provision; and (ii) if fields inside a contract area may be commercially exploited only by joint development and production.[58]

The first provision is the customary geological trigger. However, the Angolan provision is narrower than most others by applying only to contract areas that have similar unitization provisions. It is not clear what happens when the structure extends into a contract area that does not have a similar provision. (Other countries have provisions which address this circumstance more fully, as discussed below for Azerbaijan, Brazil, and Egypt.)

Less common is the second listed Angolan provision which requires unitized operations for fields that are enclosed within a single contract area, but which are not commercially viable to develop unless the fields are unitized and developed with other fields in adjacent contract areas. In this instance, joint development is authorized to allow operators to share the same infrastructure and to achieve operating efficiencies through economies of scale in developing a larger area.[59] Neither competitive drilling between rival contractors nor drainage is the problem being addressed.

China *(1995 Onshore Model Contract & 1992 Offshore Model Contract)*: China's unitization provisions are short, simple, and broad. The first trigger to compulsory unitization is the

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58. *See infra* Appendix I, Model Production Sharing Agreement, arts. 27.1–27.2 (1997) (Angl.) (PEPS).

59. *See also* Nelson Antosh, *Production Begins at Oil Hub*, HOUSTON CHRON., Dec. 9, 2003, at B3 (announcing production at the Shell/BP deepwater Na Kikaka platform in the Gulf of Mexico, designed to handle production from six small fields stretching along a forty-mile line, each of which is too small to justify development on its own).

customary one: A field is found to extend into a contract area held by others. The second is broader: Unitization is required if a discovery is noncommercial on its own, but would be commercial if developed by linking it with facilities located outside the contract area.[60]

The remaining countries have only a single trigger for unitization: the geological fact that a field is found to extend beyond a contract area. The laws, with commentary, are as follows:

Azerbaijan *(2000 Oil and Gas Law)*: If part of a single oil and gas field is located in one contract area and extends into the contract area of a different contractor, the contractors may enter into an agreement with the proper Executive Authority to unitize the field.[61]

A second unitization-related provision appears in the 1999 Production Sharing Agreement (PSA) in the Padar Area. It provides that the State Oil Company of Azerbaijan Republic (SOCAR) shall be entitled, but not obligated, to grant an additional area to the contractor when the pool extends outside the contract area, such addition to then become part of the agreement.[62] This provision is included in Article 5.4 on discovery and can properly be considered an additional right of the existing contractor rather than a duty to unitize to prevent waste of the country's natural resource. Nonetheless, such a provision does solve, by pre-emption, problems of competitive drilling that might arise in a contract area, and so it is a "unitization-related" provision.

60. *See infra* Appendix I, Model Contract for Third Onshore Bidding Round 1995 plus Annex, arts. 11.7–11.8 (P.R.C.) (PEPS); Model Contract for Fourth Offshore Bidding Round 1992 plus Annex, arts. 11.7–11.8 (P.R.C.) (PEPS).

61. *Infra* Appendix I, The Oil and Gas Law of the Azerbaijan Republic: Parliament Commission Draft, art. 13 (2000) (Barrows Supp. No. 43, Russia & NIS).

62. *Infra* Appendix I, Azerbaijan's Padar Area PSA, *supra* note 54, art. 5.4.

Brazil *(Petroleum Law No. 9778)*: If fields extend under adjoining blocks operated by other contractors, the parties shall agree on splitting production.[63]

(2003 Model Concession Agreement): Brazil's Model Agreement provides an additional unitization procedure when the straddling reservoir extends into an area not yet granted to a contractor. In this case, Brazil's National Petroleum Agency (Agência Nacional do Pétroleo, or ANP) will play the role of a contractor on the adjacent tract, but without bearing any costs of appraising or developing this tract.[64] The cost burden will fall on the existing contractor, subject to a right to recover under certain circumstances. The ANP will offer the adjacent area for bid to investors. The effect of this provision can pose a dilemma to the existing contractor: It can wait until ANP promotes a bid on the adjacent area, or it can proceed with operations and bear, at its sole risk, the investment to appraise the relevant discovery. Once commerciality is declared, the existing contractor may recover its investment on the adjacent area by being reimbursed by the new contractor (or as a cost deduction for tax purposes). However, if commerciality is not declared, the existing contractor will bear the loss related to the appraisal.[65]

Colombia *(2002 Model Contract (Frontier Areas))*: If an economically exploitable field extends into another contract area, the operator, in agreement with Ecopetrol (Colombia's national oil company) and the other interested parties must implement a joint development plan.[66]

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63. *Infra* Appendix I, Petroleum Law No. 9778, art. 27 (1997) (Braz.) (PEPS).

64. *See infra* Appendix I, Model Concession Agreement (5th ANP Round), cl. 12.1.2 (2003) (Braz.) (PEPS). The analysis in this paragraph is from Amui & Melo, *supra* note 8, at 14, an excellent article on Brazil's unitization framework.

65. Amui & Melo, *supra* note 8, at 14.

66. *Infra* Appendix I, Model Contract (Frontier Areas): B Contract - For Exploration Projects, cl. 16 (2002) (Colom.) (PEPS).

Ecuador *(2002 Model Production Sharing Contract)*: Contractors are required to unitize when a common reservoir extends across two or more contract areas.[67] Interestingly, Petroecuador (Ecuador's national oil company) is also required to unitize if it is acting for itself in an affected area. The triggering event in Ecuador is a determination by the Ministry of Energy and Mines that a common reservoir exists. Until that time, the Model Production Sharing Contract (PSC) expressly states that a contractor has the right to exploit at its own account and risk as long as it does so within its contract area and has not submitted a request for the declaration of a common reservoir.[68]

Ecuador's provision appears to give the contractor that is most advanced in the development of the reservoir an opportunity to delay unitization by not submitting a request for the declaration of a common reservoir. Nothing in the surveyed laws appears to impose a duty on the contractor to submit such a request when it appears that a common reservoir situation exists. A contractor that is draining an adjacent area has an incentive to delay unless the authorities make unitization retroactive to the date that drainage is likely to have begun.

Egypt *(Decree 758 of 1972, 1998 Model Concession Agreement, & 1997 Agreement between Egypt and Norsk Hydro (These last two are identical.))*: The Egyptian General Petroleum Corporation, formerly the General Egyptian Petroleum Organization,[69] "may" ask concessionaires holding interests covering a common producing layer to reach an agreement on joint efforts toward best exploitation in accordance with industry norms.[70]

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67. *Infra* Appendix I, Model Production Sharing Contract, cl. 8.8 (2002) (Ecuador) (PEPS).

68. *Id.* art. 8.8.1.

69. In 1976 the General Egyptian Petroleum Organization became the Egyptian General Petroleum Corporation under Law No. 20 of 1976. *See* PETROLEUM ECON. & POLICY SOLUTIONS, IHS ENERGY, LEGAL, FISCAL & CONTRACTUAL TERMS: EGYPT SUMMARY ANALYSIS (Mar. 2002), http://peps.ihsenergy.com/ (follow "new user" hyperlink; then follow "PEPS" hyperlink).

70. *Infra* Appendix I, Decree 758 of 1972, art. 45 (Egypt).

In addition, Egypt has a unitization-related provision in its form of model contract that favors the existing contractor by including additional acreage in the contractor's development block. This provision appears in Article III of the agreement titled "Grant of Rights and Terms."[71] It is not a true unitization provision in that unitization is not a duty required of the contractor by the state to prevent waste. Rather, under the contract provision, unitization is triggered upon an application from a contractor if oil or gas is being drained from an exploration block into a development block on an adjoining concession area held by the same contractor. In this event, the block being drained shall be considered as participating in the commercial production of the development block, and the drained block shall be converted into a development lease with the ensuing allocation of costs and production, calculated from the effective date of draining between the two areas. The allocation shall be in the same portion that the recoverable reserves in the drained structure bear to total recoverable reserves in the structure underlying both contract areas.[72]

Indonesia *(Decree 402 of 1967)*: Under this decree, companies are prohibited from operating outside their contract areas, but exploration and exploitation may be carried out in a unitized way.[73] The provision seems to mean that companies must operate inside their contract area unless they have unitized their operations when the operations extend beyond the contract area. The decision to unitize is made by the Director General of Oil and Gas, based on his own judgment or at the request of one or more of the oil companies concerned. The Director General appears to have complete discretion over the approval or disapproval of the unitized exploitation. The regulations do not stipulate any criteria to serve as a basis for making such a decision.

While the regulations prohibit the companies from conducting activities outside the contract area, no provision

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71. *Infra* Appendix I, Model Concession Agreement, art. III (1998) (Egypt) (Barrows Supp. No. 124, N. Africa).

72. *Id.*

73. *Infra* Appendix I, Decree No. 402/D/D/MIGAS/1967, art. 1 (1967) (Indon.).

prevents such companies from continuing activities within the contract area once it has been determined that the structure underlies other contract areas. In such a case the regulations can be interpreted to allow drainage, until and if a decision is made by the Director General. Also, the regulations seem to provide only for the unitization of structures that underlie several contiguous contract areas and not for the unitization of structures extending beyond the boundaries of a contract area into open acreage in which no contracts have yet been awarded.

D. Voluntary or Compulsory Unitization

In the United States, as noted above, all producing states except Texas have compulsory unitization laws to overcome the virtually impossible hurdle of securing unanimity, particularly on participation factors, from so many private owners and their lessees.[74] This pattern is repeated internationally. Even though fewer participants are involved, finding the "perfect" participation formula is still both technically complex and subject to different opinions of what is fair.[75] Compulsory process as a backstop to failed voluntary efforts to unitize seems to be a near-universal necessity.

In the ten countries that have unitization provisions, eight clearly authorize the government to require unitization—Angola, Brazil, China, Colombia, Ecuador, Egypt, Nigeria, and the United Kingdom—and a ninth, Indonesia, appears to do so, although the decree is vague. In the first eight countries named, the provisions require that the parties first attempt to secure unitization by voluntary agreement. If the parties cannot agree voluntarily, some countries specify how a unitization plan will be imposed on them, usually through government intervention, as discussed above in subpart II.C. Few private parties will welcome such government intrusion. Thus, the typical unitization framework may be more aptly characterized as

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74. *See* WEAVER, *supra* note 2, at 35.

75. Amui & Melo, *supra* note 8, at 18–19 (providing a nice list of problem issues); *see also* Al Boulos, *The Technical Aspects of Unitization* (monograph in Jacqueline Weaver's files) (providing an excellent overview of the technical aspects of unitizing a field, involving the expertise of geologists, geophysicists, petrophysicists, and reservoir engineers, more so than lawyers).

"compulsory voluntary unitization." Azerbaijan is the sole country that relies entirely on voluntary methods of securing a unitization agreement.[76]

China's Model Contracts use rather indirect language, but appear nonetheless to require unitization: If an oil or gas field straddles a boundary, or if linking facilities in two contract areas makes a noncommercial development commercial, then the CNOOC (China National Offshore Oil Corporation) "shall arrange for the Contractor and the neighboring parties involved to work out a unitized Overall Development Program for such Field and to negotiate the provisions thereof."[77] The provision contains no mention of approval by a ministry or any other approval procedures. However, the Overall Development Program would have to be approved by CNOOC and ultimately the relevant government authorities.

E. Purposes of Unitization

As noted in subpart I.D, unitization serves three essential purposes: (i) preventing physical waste; (ii) preventing economic waste; and (iii) protecting correlative rights (fair shares). While some unitization statutes in the United States include all three purposes,[78] most state conservation commissions cannot order unitization solely for the purpose of protecting correlative rights.[79] Unitization approval almost always requires a finding that increased recovery of oil and gas will occur under the proposed unit plan. Moreover, a body of case law has developed in the United States that makes the prevention of waste (increasing the size of the "petroleum pie") a more important purpose than protecting correlative rights (dividing shares of the

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76. The 1996 Unitization Agreement in the Caspian Sea Area of Azerbaijan includes a provision confirming that unitization is only voluntary, "as mutually agreed between the Parties." *Infra* Appendix I, Amoco Group Agreement Dated 14 December 1996 on the Exploration, Development & Production Sharing for the Prospective Structures Ashrafi, Dan Ulduzu & Area Adjacent in the Azerbaijan Sector of the Caspian Sea, art. 4.4 (1996) (Azer.) (Barrows Supp. No. 24, Russia & NIS).

77. *Infra* Appendix I, Model Contract for Third Onshore Bidding Round 1995 plus Annex, art. 11.7 (P.R.C.) (PEPS).

78. *See, e.g.*, N.M. Stat. Ann. § 70-7-1 (LexisNexis 1995).

79. *See, e.g.*, TEX. NAT. RES. CODE ANN. § 101.011 (Vernon 2001) (failing to include all three of the purposes served by unitization).

pie) in cases when the conservation commission must choose between the two purposes.[80]

Outside the United States, only a few of the countries in this survey even specify the purposes unitization is to serve. In no country is the protection of correlative rights a purpose of unitization, although several countries' provisions require that the agreement ultimately be fair and equitable as discussed below in subpart II.H. This failure to mention correlative rights protection as a purpose of unitization is perhaps not surprising in the international context where the country is the only landowner and will receive its share of royalties, taxes, and other payments regardless of which contract area is produced and developed, absent different royalty, production sharing fractions, or tax rates applicable to the affected contract areas.

The country provisions that address the purposes of unitization are as follows:

Angola and China: As discussed above in subpart II.C, these two countries can require unitization of separate fields to achieve operating efficiencies that render commercially viable a field that would not be viable unless jointly developed.

Nigeria and the United Kingdom: Nigeria's 1969 Petroleum Regulations require unitization if it is in the national interest for the grantee, licensee, or lessee to secure the maximum ultimate recovery of petroleum.[81] Nigeria's 1979 Service Contract authorizes unitization to secure "as far as is practicable minimum total expenditure and maximum oil recoveries and economic efficiency . . . to prevent waste of reservoir energy and consequently prevent the loss of recoverable hydrocarbons."[82] The U.K. Petroleum Regulations are similar: Unitization is authorized if it is in the national

80. 2 SMITH & WEAVER, *supra* note 16, ch. 8.3(A), at 8-30.

81. *Infra* Appendix I, Petroleum (Drilling and Production) Regulations, art. 47(1)(b) (1969) (Nig.) (Barrows Supp. No. 22, S. & C. Africa).

82. *Infra* Appendix I, Service Contract of September 1979 Between a Private Company (Name Confidential) & Nigerian National Petroleum Corporation (NNPC), art. 10.4 (1979) (Nig.) (Barrows Supp. No. 65, S. & C. Africa) [hereinafter Nigeria's Service Contract].

interest "to secure the maximum ultimate recovery of petroleum and in order to avoid unnecessary competitive drilling."[83]

Ecuador: Ecuador's 2002 Petroleum Regulations authorize unitization to "improve the efficiency and economy of the operation."[84]

F. Oil versus Gas

In the United States, unitization statutes are often limited to oil fields or to certain types of gas operations.[85] A major

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83. Kramer & Conine, *supra* note 17, at 642 (quoting language from the U.K. Model Clauses). These two authors pose (but do not answer) a query to the student reader: Can the U.K. Minister require unitization to implement secondary recovery to increase production when there is no risk of unnecessary competitive drilling in such an operation? *Id*. While this query may be of interest only to academics, a similar issue actually arose in *Clark Oil Producing Co. v. Hodel*, 667 F. Supp. 281, 285, 288, 290 (E.D. La. 1987). In that case, two different licensees on the U.S. Outer Continental Shelf were ordered to unitize by the federal supervisor. *Id.* at 283–84. Without unitization, one licensee would have had to drill more wells and the production of the other licensee would have had to be curtailed in order to protect each operator's fair share of total reserves. *See* Roger D. Williams, *Mandatory Unitization of Oil and Gas Pools: Protecting Correlative Rights in a Pre-emptive Federal Regulatory Scheme*, 11 E. MIN. L. FOUND. § 24.01, § 24.04[3], at 24-21. The federal regulations at that time only authorized unitization "in the interest of conservation," not to protect correlative rights or prevent economic waste. *Clark Oil Producing Co.*, 667 F. Supp. at 287. The court upheld the unitization order on the basis that the prevention of unnecessary well drilling was in the interest of conservation. *Id.* at 290. Subsequently, the federal agency amended the regulations to allow unitization for any of the three purposes of conserving natural resources, preventing waste, or protecting correlative rights. Williams, *supra*, § 24.04[3], at 24-21, 24-22 (citing 30 C.F.R. § 250.50(a) (1986)). At the same time, the government agency declared that "[g]enerally, unitization [would] not be authorized solely to protect correlative rights." *Id.* § 24.04[3], at 24-22. The rule of capture would apply to the development of Outer Continental Shelf petroleum, unless different lessees had "unequal development opportunities, and the inequality was not apparent at the time the leases were offered." *Id.* § 24.04[3], at 24-22.

84. *Infra* Appendix I, Hydrocarbon Operation Rules, art. 51 (2002) (Ecuador) (PEPS).

85. For example, in Texas, unitization is authorized for units "necessary to effect secondary recovery operations for oil or gas, including those known as cycling, recycling, repressuring, water flooding, and pressure maintenance" or for operations "necessary for the conservation and use of gas, including those for extracting and separating the hydrocarbons from the natural gas or casinghead gas and returning the dry gas to a formation." TEX. NAT. RES. CODE ANN. § 101.011 (Vernon 2001). In a cycling operation, wet gas is removed from wells located at one end of the field. The wet gas is passed

reason for this is that unitization was usually sought only for secondary recovery operations in oil fields. For decades in the early development of the U.S. petroleum industry, gas was an unwanted by-product of oil production, often flared at the wellhead or used to repressure oil fields to extract more oil.[86] Secondly, in nonassociated gas fields, the basic displacement mechanism is simple expansion of the gas when pressure is released at one or more wells.[87] Recovery rates of ninety percent or more are routine, without conservation regulations such as maximum production rates and well placement that are required in oil fields, and without unitized operations.[88] Because gas drains from a wider radius than oil, the principal effect of unitizing gas fields is the protection of the correlative rights of rival operators, not the prevention of physical waste of gas.[89] While unitized operations can also prevent drilling unnecessary gas wells by adjacent operators, the prevention of physical waste, not economic waste, was the preeminent reason that states enacted compulsory unitization.[90] Indeed, politicians rather like the jobs created by drilling unnecessary wells.[91]

Yet, there are good reasons to allow the unitization of gas fields as well as oil fields, especially in deepwater gas fields and frontier areas where infrastructure development is extremely costly. Gas processing, distribution, and marketing are often more difficult and expensive tasks than similar oil activities, and cooperative agreements to perform these tasks could allow greater ultimate recoveries. For example, joint processing of gas condensate in a large plant owned by many operators in a field is much more efficient than if each operator constructed a

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through a cycling plant which removes the liquid condensate, and the dry residue gas is reinjected into the reservoir to keep pressure high. The injection wells are located at the opposite end of the field from the producing wells, so cooperative development through unitized operations is essential. *See* WEAVER, *supra* note 2, at 19–20.

86. *See* WEAVER, *supra* note 2, at 142–48.

87. *See id.* at 19.

88. *See id.*

89. *See id.* at 68–74.

90. *See* MCDONALD, *supra* note 14, at 201–09 (discussing the principal benefit of unitization: the prevention of physical waste), 225–26 (discussing states' motivations in enacting compulsory unitization).

91. *See* 2 SMITH & WEAVER, *supra* note 16, ch. 8.4(B), at 8-76.

separate plant.[92] This substantial cost saving can allow operators to develop a field that would be uneconomic if developed on a stand-alone basis and to continue to produce the field for a longer time, thus recovering condensate that otherwise would have been abandoned as uneconomic.

In the United States, some unitization statutes prohibit the cooperative marketing or refining of oil or gas because such activities were not considered necessary for conservation of oil or gas and raised antitrust concerns.[93] Yet, joint marketing of gas can enable producers to negotiate better terms with buyers, which in turn can result in higher recoveries of gas.[94] Further, joint marketing of gas in the United States can solve the thorny problem of protecting correlative rights in gas fields where different lessees/licensees have different access to marketing

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92. This reasoning explains why some U.S. unitization statutes expressly allow cooperative agreements to extract hydrocarbons from gas even though they do not allow unitization of gas fields generally. *See, e.g.*, TEX. NAT. RES. CODE ANN. § 101.011 (Vernon 2001).

93. *See, e.g.*, 2 SMITH & WEAVER, *supra* note 16, ch. 11.2(A), at 11-11.

94. MCDONALD, *supra* note 14, at 209, 245 (advocating unitization as a mechanism to facilitate efficient gas marketing, and proposing that the U.S. Congress expressly sanction cooperative gas marketing in unitized fields to eliminate the risk of antitrust liability). *See also* Williams, *supra* note 83, § 24.01, at 24-3. This issue also surfaced in New Zealand in 2003, where three companies sought the approval of the Commerce Commission (New Zealand's antitrust monitor) to jointly sell gas from the Pohokura gas field. Marta Steeman, *Gas Owners Push Joint Selling; No Harm to Competition Claimed,* DOMINION POST (Wellington, New Zealand), July 5, 2003, News Section, at 8, *available at* LEXIS, Major World Newspapers. The companies argued that approval of joint marketing was pro-competitive because it encouraged gas production from the field and thus encouraged more gas exploration. *Id.* They also argued that separate marketing by the owners would still require coordination among them, such as agreement on depleting gas rates, matching buyers' demands to each owner's entitlements, and information sharing on price for cash balancing; therefore approval of joint marketing would not be a major shift in competition policy. *Id.* The application for joint selling was opposed by companies that were likely buyers of the gas on the basis that higher prices would result with less competition between sellers. *See* Marta Steeman, *Crucial New Gas Field Thrown Into Doubt,* DOMINION POST (Wellington, New Zealand), Sept. 2, 2003, Business Section, at 2, *available at* LEXIS, Major World Newspapers. The Commerce Commission approved the joint selling, but imposed so many conditions that the three selling producers said they would reconsider their options. *See id.* The Commerce Commission calculated that joint selling would produce benefits ranging from $47 million to $81 million from earlier production of gas even though joint selling was potentially anticompetitive. *Id*.

outlets, resulting in drainage, both between license block owners and between different members of the joint operating agreement (JOA), triggering complicated issues of gas balancing.[95] Note, however, that even if antitrust objections to joint marketing are overcome, there still may be tax effects.[96]

Nonetheless, few unitization statutes in the United States provide for joint marketing or for gas balancing rights, even when the statutes authorize unitization of gas fields. The unitization order or agreement allocates shares of production, but does not force one lessee to share its marketing outlet or buyer's contract with other lessees in the unit. Producers must find gas-balancing rights either in their private contracts or in the common law.

In gas fields in the developing world, joint marketing is quite common because of the difficulty in finding or developing a market for the gas. The unitization provisions of the countries in this survey apply to both oil and gas fields, where their scope can be determined.

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95. Despite complex regulations governing natural gas prorationing and ratable take principles, the correlative rights of gas producers are difficult to protect when producers have different purchasers with different market demands. Jacqueline Lang Weaver, *Unitization Revisited*, *in* 45 INST. ON OIL & GAS L. & TAX'N § 7.05, at 7-25 to 7-27 (1994), and sources cited therein. The state of Mississippi has a unique Natural Gas Marketing Act (MISS. CODE ANN. §§ 75-58-1 to 75-58-21 (West 1999)), passed to give all owners of natural gas wells an "opportunity to extract their fair share of gas." While the Act is written in terms of operators and nonoperators of an individual well, its principles can easily be modified to apply to the relationship between the operator of a fieldwide unit and the other nonoperating producers. Weaver, *supra*, § 7.05(2)(b)(iv), at 7-41 to 7-42. The Act requires operators to market the gas of all nonoperators, except when a nonoperator notifies the operator that it will market its own gas. MISS. CODE ANN. § 75-58-9. The operator can market a nonoperator's gas either by negotiating short-term sales contracts (of less than a year) or by offering a long-term contract to the nonoperator containing the same terms as the operator has obtained for the sale of its own share of the gas. *Id.* In other words, the Act is a "share-the-contract" act which goes far beyond the sharing of reserves and production under a typical unitization agreement. Such an approach is, not surprisingly, quite controversial.

96. *See, e.g.*, I.R.C. § 1.761-2(a)(3). At one time, a provision of the U.S. Internal Revenue Code exposed groups from the same block who jointly marketed to the risk of U.S. corporate taxation at the JOA level; however, since the adoption of "check the box" regulations in 1996, the main effect of long-term joint marketing within the United States has been an inability to elect out of filing a partnership tax return.

Angola *(1997 Model Production Sharing Agreement & 1997 Standard Concession Decree Law)*: Article 27 of the Model PSA provides for the unitization of petroleum deposits.[97] The word "petroleum" as defined by the 1997 Standard Concession Decree Law and by various model agreements refers to both crude oil and natural gas.[98]

Brazil *(2002 Model Concession Agreement)*: The unitization provisions apply to both oil and gas. The 2002 Model Concession Agreement for the exploration, development and production of oil and natural gas applies to a discovery, and discovery is defined to include both oil and natural gas.[99]

China *(1995 Onshore Model Contract & 1992 Offshore Model Contract)*: Both the onshore and offshore model contracts provide for the unitization of both oil and gas fields.[100]

Colombia (*2002 Model Contract & 2000 Model Association Contract)*: The unitization clause refers to an economically exploitable field, which is defined as a portion of the contracted area where there are one or several overlapping structures with one or more producing reservoirs, or in which the capacity to produce hydrocarbons in commercial quantities has been

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97. *Infra* Appendix I, Model Production Sharing Agreement, art. 27 (1997) (Angl.) (PEPS).

98. Angola Standard Concession Decree Law, annex C, art. 3.1(a) (1997) (PEPS) defines petroleum to "include all solid, liquid, or gaseous hydrocarbons, including naptha, ozokerite, natural gases and asphalt and, in addition, sulphur, helium, carbon dioxide and saline substances." Article 1.45 of Angola's 1997 Model Production Sharing Agreement, *infra* Appendix I, contains the following definition for petroleum: "'Petroleum' means Crude Oil of various densities, asphalt, Natural Gas and all other hydrocarbon substances that may be found in and extracted, or otherwise obtained and saved from the Contract Area."

99. *Infra* Appendix I, Model Concession Agreement (4th ANP Round), cl. 1.2.14 (2002) (Braz.) (PEPS) (defining discovery as "any occurrence of Oil and Natural Gas, other hydrocarbons, minerals, and, in general, any other natural resources in the Concession Area, independent from quantity, quality or commercial viability, verified by at least two detection or evaluation methods").

100. *See infra* Appendix I, Model Contract for Third Onshore Bidding Round 1995 plus Annex, arts. 11.7–11.8 (P.R.C.) (PEPS), Model Contract for Fourth Offshore Bidding Round 1992 plus Annex, arts. 11.7–11.8 (P.R.C.).

proven.[101] The word "hydrocarbons" is defined as including both liquid and gaseous hydrocarbons.[102]

Ecuador *(2002 Model Production Sharing Contract)*: Clause 8.8.9 states that if the common reservoir discovered is a gas reservoir, the contractor must execute with Petroecuador an additional contract for gas before unitizing, implying that the unitization provisions of the Model Production Sharing Contract (PSC) cover both oil and gas.[103]

(2003 Operating Agreement): Ecuador's Model Operating (Unitization) Agreement is for oil only, and contains a provision in Clause 3.7 that if gas is produced but not used in unitized operations, then the gas shall be delivered to PetroProduccion (a subsidiary of Petroecuador) which can undertake investments to take advantage of this gas.[104]

Egypt *(Decree 758 of 1972, 1998 Model Concession Agreement, & 1997 Agreement between Egypt and Norsk Hydro)*: Article 45 of Decree 758 speaks in terms of an "oilfield" when addressing unitization, but it is not clear whether the use of that term is intended to be limiting. The Decree itself covers both oil and gas.[105] The model contracts refer to both oil and gas.[106]

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101. *Infra* Appendix I, Model Contract (Frontier Areas): B Contract - For Exploration Projects, cls. 15–16 (2002) (Colom.) (PEPS), Model Association Contract, cls. 15–16 (2000) (Colom.) (PEPS).

102. *Infra* Appendix I, Model Contract (Frontier Areas): B Contract - For Exploration Projects, cls. 4.2, 4.19–4.21 (2002) (Colom.) (PEPS).

103. *Infra* Appendix I, Model Production Sharing Contract, cl. 8.8.9 (2002) (Ecuador) (PEPS).

104. *Infra* Appendix I, Operating Agreement for the Unified Production of a Common Deposit, cl. 3.7 (2003) (Ecuador) (PEPS).

105. *See infra* Appendix I, Decree 758 of 1972 (Egypt).

106. *See infra* Appendix I, Concession Agreement for Petroleum Exploration and Exploitation between the Arab Republic of Egypt and the Egyptian General Petroleum Corporation and Norsk Hydro Exploration Egypt a.s. And Kufpec, art. III (1997) (Egypt) (Barrows Supp. No. 129, N. Africa), Model Concession Agreement, arts. III, XI (1998) (Egypt) (Barrows Supp. No. 124, N. Africa).

Nigeria *(1969 Petroleum Act & 1969 Petroleum (Drilling and Production) Regulations)*: The unitization provisions relate to both oil and gas, although this conclusion requires some sleuthing. In Nigeria, the words "oil field" and "oil licence" are used to refer to both crude oil and natural gas. Under the 1969 Petroleum Act, the oil license grants the right to explore for and produce "petroleum," which is defined to mean "mineral oil (or any related hydrocarbon) or natural gas."[107] Likewise in Article 47 of the 1969 Petroleum Regulations on unitization, the term "oilfield" is used to refer to a petroleum reservoir, and hence to both oil and gas.[108]

United Kingdom *(1998 U.K. Petroleum Act)*: In the United Kingdom as in Nigeria, a geological petroleum structure or petroleum field is referred to as an "oil field." Since the word "petroleum" is defined to include "natural gas existing in its natural condition in strata," the unitization provisions apply to both oil and gas.[109]

G. Area, Depth, and Number of Fields

The legal provisions of the survey countries generally require that the unitized area be specified, but no provisions expressly set limits on the area, depth, or number of fields. As noted above, only Angola and China have unitization triggers that require the joint development of two or more fields if necessary to render a project commercially viable.

The words "field" and "reservoir" (even if translated properly) can have different meanings. In U.S. practice, a field can mean a geographic area situated over several separate oil

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107. Nigeria Petroleum Act §§ 2, 15, Sched. I § 5, 1969 (PEPS). The definitions contained in the Nigerian 1969 Petroleum Act and the Unitization Provision of the 1969 Petroleum Regulations mirror the provisions contained in the United Kingdom 1998 Petroleum Act and the Petroleum Production Regulations both for Seaward and Landward Areas. *Infra* Appendix I, Petroleum (Drilling and Production) Regulations, art. 47 (1969) (Nig.) (Barrows Supp. No. 22, S. & C. Africa), Petroleum (Production) (Landward Areas) Regulations §§ 25.1–25.5 (1995) (U.K.) (PEPS).

108. *Infra* Appendix I, Petroleum (Drilling and Production) Regulations, art. 47(1)(a) (1969) (Nig.) (Barrows Supp. No. 22, S. & C. Africa).

109. Petroleum Act, 1998, c. 17, § 1 (Eng.).

and gas reservoirs which are vertically or horizontally separated from each other, or which are overlapping, contiguous, or superimposed on each other. A "field" may embrace several "pools" of oil or gas, or a field may mean each physically separate productive "stratum" that is not in pressure communication with another stratum.[110] Sometimes, the particular definition chosen significantly affects the authority of the conservation commissions in the United States to regulate for certain purposes.[111] Outside of the United States, few provisions in this survey expressly differentiate between pools, strata, reservoirs, and fields.[112] As a general principle, the unit area should be geographically defined in a manner that best prevents physical and economic waste, regardless of how many strata or reservoirs lie within the area. Two countries in the survey seem to recognize this principle and allow strata (in the plural) to be unitized as one field, as follows:

United Kingdom *(1995 Petroleum (Production) (Landward Areas) Regulations & 1988 Petroleum (Production) (Seaward Areas) Regulations)*: These regulations read that if strata in a contract area or any part thereof are found to form part of a single petroleum field underlying other licenses granted then in force, it is in the national interest to order unitization to secure the maximum ultimate recovery of petroleum and avoid unnecessary competitive drilling.[113]

110. *See* WILLIAMS ET AL., *supra* note 2, at 408 (defining "field").

111. *See*, *e.g.*, 3 SMITH & WEAVER, *supra* note 16, ch. 12.3(A), at 12-17 to 12-18.

112. A typical production sharing agreement provides that the oil and gas company will be required to relinquish acreage if it fails to discover a commercially viable field. The failure to expressly define these terms (pools, strata, reservoirs, and fields) has resulted in a billion-dollar debate between host governments and oil and gas companies regarding the acreage the oil and gas companies will be entitled to retain when they make a commercially viable discovery. *See* Peter B. Derman & Andrew B. Derman, *Unitization—A Mathematical Formula to Calculate Redeterminations*, AIPN ADVISOR, Nov. 2002, at 8 n.1.

113. *See infra* Appendix I, Petroleum (Production) (Landward Areas) Regulations § 25.1 (1995) (U.K.) (PEPS), Petroleum (Production) (Seaward Areas) Regulations § 28.1 (1988) (U.K.) (PEPS).

Nigeria *(1969 Petroleum (Drilling and Production) Regulations)*: Nigeria's petroleum regulations, while similar to those of the United Kingdom, are less clear in differentiating strata from fields. [114]

H. Factors Determining Unit Interests or Redetermination

In the United States, conservation statutes generally require that the conservation commission act to assure that each owner of a common reservoir has a reasonable opportunity to recover a "fair share." Often, the "fair share" is further defined as the amount of recoverable oil or gas underlying each owner's tract, such that uncompensated drainage between tracts is prevented.[115] Sometimes, but not always, the principle is phrased such that an owner should not be required to go to unnecessary expense to recover his fair share of the oil or gas.[116] Some pooling or unitization statutes list several factors which the commission should consider, such as acreage, recoverable oil or gas, location on structure, and the burden of the unitized operation on the tract.[117] In all cases, however, the ultimate result must be fair and reasonable to the owners.[118]

Outside of the United States, the unitization provisions in this twelve-country survey give only the broadest outline of the factors to be used in determining or redetermining unit shares. Most often the provisions simply state that shares should be equitable:[119]

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114. *See infra* Appendix I, Petroleum (Drilling and Production) Regulations, art. 47 (1969) (Nig.) (Barrows Supp. No. 22, S. & C. Africa) (referring to the entire geological reservoir as an "oilfield").

115. Jed B. Maebius, Jr., *Statutory Guidelines for Determining 'Fair Share,'* 2 ST. MARY'S L. J. 63, 65 (1970). Some prorationing statutes provide standards that the commissions should use, such as considering the natural flow of gas wells (which actually prevents the commission from considering reserves in place). *Id*. at 70.

116. *Id*. at 65.

117. *Id*. at 72.

118. *Id.* at 79.

119. Amui & Melo, *supra* note 8, at 19, list the following factors to consider in determining equitable shares in international unitization agreements: acreage, "estimated oil in place, estimate[d] recoverable reserves, number of useable wells for production and injection, current and cumulative production, reservoir production mechanisms . . . and others." Al Boulos lists stock tank oil originally in place, movable oil

Angola *(1997 Model Production Sharing Agreement)*: Angola is unique in providing that the unitization plan must "establish an adequate rate of return for [the] Contractor Group compatible with the proportional share which the latter assumes in the joint Development and Production."[120]

Brazil *(Petroleum Law No. 9778 & 2003 Model Concession Agreement)*: The rights and obligations of the parties to the unitized blocks shall be "equitably appropriated [a better translation would probably use the word "apportioned" rather than appropriated], based on applicable general legal principles."[121] Brazil's Model Concession Agreement must "equitably contemplate the rights and obligations of the [c]oncessionaires."[122]

Ecuador *(2002 Model Production Sharing Contract & 2003 Model Operating Agreement)*: Ecuador's Model PSC provisions (Clauses 8.8.6 and 8.8.8) clearly contemplate redeterminations and adjustments to the percentage shares of production and costs, but offer no substantive guidelines for how fair shares are to be determined.[123] However, Ecuador's Model Unit Agreement is very specific regarding how shares of the parties are to be determined.[124] In Clause 8 and Annex 7, the Model Unit Agreement provides the formula for calculating shares. It uses audited production volumes from the unit area and participation factors based on shares of proven reserves, scaled depending on the size of the reservoir's reserves and on the price of crude oil;

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originally in place, or recoverable reserves as possible bases for tract participations (the first having been used in the majority of unitized North Sea oil fields). See *infra* subpart V.D for further details.

120. *Infra* Appendix I, Model Production Sharing Agreement, art. 27.5 (1997) (Angl.) (PEPS).

121. *Infra* Appendix I, Petroleum Law No. 9778, art. 27 (1997) (Braz.) (PEPS).

122. *Infra* Appendix I, Model Concession Agreement (5th ANP Round), cl. 12.2 (2003) (Braz.) (PEPS).

123. *Infra* Appendix I, Model Production Sharing Contract, cls. 8.8.6, 8.8.8 (2002) (Ecuador) (PEPS).

124. *See infra* Appendix I, Operating Agreement for the Unified Production of a Common Deposit, cl. 8, annex 7 (2003) (Ecuador).

that is as reservoir size and the price of oil increase, the contractor's share decreases.

Nigeria and the United Kingdom: The petroleum regulations of both countries state that the unitization must be "fair and equitable" to the contractors/licensees.[125] In the United Kingdom, the U.K. Department of Trade and Industry (DTI) offers guidance notes of interest.[126] After confirming that the Secretary of State has powers to require unitization to maximize ultimate recovery and avoid unnecessary competitive drilling, the notes state that the Secretary will not necessarily refuse to grant development consent to a group of licensees who have not concluded a unitization agreement.[127] The notes continue as follows:

> The Department does not consider that powers to require uniti[z]ation extend to issues of fairness and equity between groups of [l]icensees. . . . [P]roprietary rights do not exist in unextracted hydrocarbons . . . .
>
> The Department's acceptance or rejection of any [f]ield [d]evelopment [p]rogram[] will, therefore, be on the basis of whether or not it is an optimum development in terms of maximizing the economic recovery of oil and gas.[128]

These notes clearly indicate that the national interest lies in

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125. *Infra* Appendix I, Petroleum (Drilling and Production) Regulations, art. 47(4) (1969) (Nig.) (Barrows Supp. No. 22, S. & C. Africa), Petroleum (Production) (Landward Areas) Regulations § 25.4 (1995) (U.K.) (PEPS).

126. *Infra* Appendix I, DTI OIL & GAS DIRECTORATE—REGULATION GUIDANCE NOTES.

127. *Id.* at cl. 2.5.1.

128. *Id.* In a similar vein, the Texas conservation commission (called the Railroad Commission) for many years approved unitization orders that included the statement that "the Commission in no way passes upon the equity of [the] basis of participation, that being a matter of contract between parties executing said agreement." 2 SMITH & WEAVER, *supra* note 16, ch. 11.4(B)(2)(c), at 11-29. The Commission's approach directly conflicted with the language of the statute that required that the Commission find that "the rights of the owners of all the interests in the field, whether signers of the unit agreement or not, would be protected under its operation." *Id.* The Commission's philosophy reflected the fact that the Texas statute does not authorize compulsory unitization; if an owner did not like the voluntary agreement offered to him by unit proponents he could simply refuse to join. *See id.* at 11-30.

achieving greater recovery rates and efficiency (increasing the size of the pie) rather than in the distribution of the pie among its owners. If licensees fail to unitize, but waste is not occurring, the result appears to be that the United Kingdom will allow the rule of capture to apply between licensees rather than to tolerate delayed field development. The United Kingdom does not have a national oil company that might be a party to the contracts, so the country's returns from oil and gas production derive solely from royalty and fiscal terms that are tied to recovery. It is quite possible for a development plan to maximize recovery even though the distribution of the production from the field is considered unfair by some licensees with interests in the field. Like many U.S. states (particularly Texas), the doctrine of correlative rights or "fair share" takes a back seat to maximizing the physical recovery of oil or gas, even when the state conservation commissions have jurisdiction over both issues.

I. Recognition for Royalty and Fiscal Purposes

The primer on unitization in subpart I.E has already described the usual effects of unitization on the underlying leases and licenses of the unitized owners. In the United States, unitization statutes often provide that the parties' contractual and property rights established in the underlying leases, deeds, or other documents remain in effect except as necessary to conform to the unitization order.[129] Some statutes further provide that contracts for the sale or purchase of production from a tract also remain in effect, governing the allocated production.

Only a few provisions in the survey countries expressly address the effect of unitization on the country's royalty and fiscal rights, as follows:

Brazil *(2003 Model Concession Agreement)*: The Model Agreement simply states that payments for government and third-party participation are to be based on the specified

129. Eckman, *supra* note 48, at 367.

amounts in the respective concession contract for each contractor.[130]

Ecuador *(2002 Model Production Sharing Contract)*: Clause 8.8.8 states that unitization cannot affect the country's production sharing in the main contract.[131]

(2002 Hydrocarbon Operation Rules): Article 51 states that the operating agreement for unitized operations is "subject to the same contractual regime as the main [C]ontract."[132]

(2003 Model Operating Agreement): Several provisions of this model form refer back to the underlying contracts. In Clause 3.4, the "same rights and obligations of the Parties under the Participation Agreement are applicable"[133] to the unit agreement. Clause 3.6 states that the rights and obligations of the parties specifically with respect to the development and production of the unitized reservoir are the same as those under the Participation Agreement, but only "[when] applicable."[134] Clause 3.6 then continues that "[i]n consequence, all agreements, contracts, or covenants between [Petroecuador] and Contractor applicable to the Participation Agreement shall be applied in the same manner"[135] to the unitized agreement. Clause 3.5 expressly requires that the financial and accounting

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130. *Infra* Appendix I, Model Concession Agreement (5th ANP Round), cl. 12.2 (2003) (Braz.) (PEPS). In addition, ANP Administrative Ruling No. 10/99, dealing with a special participation payable to the government in the event of high production volumes or high earnings, states that if a field extends into more than one concession area, the determination of the special participation will be based on the net production revenue and total measured production volumes of the field. The unitization agreement signed by the different concessionaires will define their shares of the net production revenue during the base period, and as a result, the relevant special participation. *139 Barrows, South America Basic Oil Laws & Concession Contracts 1, 3 (1999)*.

131. *Infra* Appendix I, Model Production Sharing Contract, cl. 8.8.8 (2002) (Ecuador) (PEPS).

132. *Infra* Appendix I, Hydrocarbon Operations Rules, art. 51 (2002) (Ecuador) (PEPS).

133. *Infra* Appendix I, Operating Agreement for the Unified Production of a Common Deposit, cl. 3.4 (2003).

134. *Id*. at cl. 3.6.

135. *Id*.

statements of the unit agreement be handled independently from the Participation Agreement and provides a blank space to insert the contractor's sole risk percentage share of investments for the unitized reservoir.[136] Under Clause 12, taxes and other items shall be paid "in accordance with . . . the Participation Agreement."[137] As a catchall, Clause 17 states that "the terms and conditions of the Participation Agreement shall apply in everything not expressly provided otherwise"[138] in the unit agreement, and in the event the two contradict, the Participation Agreement shall prevail.

J. Recognition for Purposes of Perpetuating the Contract

No provisions in the laws or regulations of the surveyed countries directly address the effect of unitization on perpetuating the contractual interests of the parties to the unit once the unit is formed. Angola has a unique provision that extends the time for any contractual commitments to be satisfied, but it is applicable only during the time period involved in negotiating the unitization agreement.[139]

K. Consequences of Failure to Unitize or Secure Approval of Unitization Plan

In the United States, the consequence of a failure to agree to unitize voluntarily is that the conservation commission may be able to compel unitization.[140] However, if the required percentage of voluntary agreement needed to trigger compulsory process is not met, one of two things is likely to happen: Either the rule of capture will prevail in the field (albeit limited by other conservation laws such as prorationing and well spacing), or the conservation commission may issue a "no waste" order that seriously restricts the maximum amount that the field can produce. Such an order often convinces operators that they

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136. *Id.* at cl. 3.5.

137. *Id*. at cl. 12.

138. *Id.* at cl. 17.

139. *Infra* Appendix I, Model Production Sharing Agreement, art. 27 (1997) (Angl.) (PEPS).

140. *See supra* subpart I.E.2.

should agree to unitize.[141]

Outside the United States, a country can require unitization without any minimum percentage of voluntary agreement, but initial voluntary efforts to unitize are required. If the parties cannot agree voluntarily, the countries have different procedures leading to unitization, as follows:

Angola *(1997 Model Production Sharing Agreement)*: If no unitization plan is agreed to within the specified time period, Sonangol, the national oil company, may at the expense of the contractor arrange for a mutually acceptable independent consultant to propose the plan "in accordance with generally accepted practice in the international petroleum industry."[142] The penalty for failure to reach agreement after this consultant's plan has been proposed is severe: The contractor may be required to relinquish those parts of the contract area and the petroleum deposits which require unitized development.[143]

Brazil *(Petroleum Law No. 9778 & 2003 Model Concession Agreement)*: If the parties fail to agree on a unitization plan, ANP may act as mediator in the process, upon request of the parties.[144] If ANP does not approve the agreement proposed by the parties, development and production may be suspended.[145] Ultimately, under Article 27 of Brazil's petroleum law, if the parties cannot agree, ANP shall, based on arbitration, equitably allocate the rights and duties of the parties.[146]

Ecuador *(2002 Model Production Sharing Contract)*: Clauses 8.8 and 8.8.4 of the Model Contract allow for a provisional operational unitization agreement if no definitive agreement can

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141. WEAVER, *supra* note 2, at 21–22, 28–29, 148–49.

142. *Infra* Appendix I, Model Production Sharing Agreement, art. 27.4 (1997) (Angl.) (PEPS).

143. *Id.* art. 27.7.

144. *Infra* Appendix I, Model Concession Agreement (5th ANP Round), cl. 12.2.2 (2003) (Braz.) (PEPS).

145. *Id*.

146. *Infra* Appendix I, Petroleum Law No. 9778, art. 27 (1997) (Braz.) (PEPS).

be reached by the parties.[147] However, the provisional agreement cannot extend past 180 days and must still have Ministry of Energy and Mines approval.[148] Because of these limitations, it seems unlikely that this provision would often be used by the parties. It would appear as difficult to gain approval of a provisional agreement as a permanent one.

If the parties cannot reach accord on the provisional agreement, the parties can request that the Ministry establish the basic exploitation parameters.[149] It is not clear if the Ministry then establishes the parameters of a provisional agreement or a definitive one.

Egypt *(Decree 758 of 1972)*: Under Article 45 of the Decree, if the parties fail to reach agreement within six months of being notified by the Egyptian General Petroleum Corporation, this corporation may set binding rules for the unitization.[150]

Indonesia *(Decree 402 of 1967)*: Under Article 2 of this Decree, the Director General can determine distribution of costs and production between blocks if the parties do not do so voluntarily.[151]

United Kingdom *(1999 Model Clauses)*: As discussed above in subpart II.H, the United Kingdom will not require unitization to establish fair shares between licensees, and the Department of Trade and Industry may authorize a development plan as long as it results in optimum recovery of oil and gas. However, if the Minister is not satisfied with a proposed development scheme, he may impose (subject to possible challenge by arbitration) his own development plan, "which shall be fair and equitable"[152] to the licensees.

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147. *See infra* Appendix I, Model Production Sharing Contract, cls. 8.8, 8.8.4 (2002) (Ecuador) (PEPS).

148. *Id.* cl. 8.8.3.

149. *Id.* cl. 8.8.4.

150. *Infra* Appendix I, Decree 758 of 1972, art. 45 (Egypt) (PEPS).

151. *Infra* Appendix I, Decree No. 402/D/D/MIGAS/1967, art. 2 (1967) (Indon.).

152. *Infra* Appendix I, Petroleum (Current Model Clauses) Order § 25(4) (1999) (U.K.) (PEPS).

L. Procedures and the Approval Authority

Much of the length of the assembled unitization provisions in Appendix I describes procedural aspects of unitization. Some of the countries provide explicitly for arbitration in the event that the parties cannot agree on unitization or if the governmental authority does not approve their proposed agreement. Many of the provisions have detailed time limits on the unitization process and on the notices that must be sent to certain parties. The details are best read by reviewing the material in Appendix I. Sometimes the authority responsible for approving the unitization is the country's ministry or government agency responsible for hydrocarbon exploration and production, and sometimes it is the country's national oil company. This subpart addresses the authority that is responsible for approving unitization.

Angola: The national oil company, Sonangol, is the authority for awarding contracts to the foreign oil companies, and also for approving the unitization provisions. Prior to entering into a PSA with a foreign oil company, Sonangol is required to obtain a concession from the Minister of Petroleum.[153]

Azerbaijan: The Law on the Protection of Foreign Investment authorizes the Cabinet of Ministers to make petroleum agreements with foreign oil companies, each of which must be ratified by the Parliament to become effective.[154] In the past, however, State Oil Company of Azerbaijan (SOCAR), the national oil company, was authorized by the President to negotiate petroleum agreements by presidential decree issued

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153. PETROLEUM ECON. & POLICY SOLUTIONS, IHS ENERGY, LEGAL, FISCAL & CONTRACTUAL TERMS: ANGOLA SUMMARY ANALYSIS (July 2001), http://peps.ihsenergy.com/ (follow "new user" hyperlink; then follow "PEPS" hyperlink). The 1978 Petroleum Law provides that only Sonangol may hold petroleum rights under a concession awarded by the Minister of Petroleum. Sonangol may then execute a contract with a foreign oil company.

154. *See* Law of the Azerbaijan Republic About Protection of Foreign Investments, cl. 40 (1992), *available at* http://www.azembassy.org.eg/browse.php?lang=eng&page=020402.

from time to time in relation to the specific areas.[155] In one such contract with SOCAR (1999 Padar Area PSA), SOCAR assumed the role of the competent authority with respect to granting the contractor part of the structure that extends outside the contract area.[156] In April 2001, the responsibility for negotiating petroleum agreements passed to the Ministry of Fuel and Energy. The Draft Oil and Gas Law of 2000, which has not yet received legislative approval, provides that unitization agreements must be entered with the "Proper Executive Authority." Under the draft law, a petroleum agreement will no longer need separate legislative ratification and will instead be effective upon its approval by a single licensing authority. The draft law does not define that authority, but it may be the Ministry of Fuel and Energy.[157]

Brazil: The National Petroleum Agency (Agência Nacional do Pétroleo, or ANP) is the licensing authority in Brazil with authority to approve unitization.[158]

China: Unitization is regulated by the national oil company with whom the agreement was entered, that is, the China National Petroleum Corporation (CNPC) onshore and China National Offshore Oil Corporation (CNOOC) offshore.[159]

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155. For example, in February 1994 a presidential decree provided such authorization in respect to the Azeri, Chirag, and Guneshli fields for which the first production sharing contract was concluded in September 1994. Natig Aliyev, *The Contract: Anticipating the Future*, AZER. INT'L, Winter 1994, *available at* http://www.azer.com/aiweb/categories/magazine/24_folder/24_articles/24_oilcontract.html.

156. Azerbaijan's Padar Area PSA, *supra* note 54, art. 5.4.

157. PETROLEUM ECON. & POLICY SOLUTIONS, IHS ENERGY, LEGAL, FISCAL & CONTRACTUAL TERMS: AZERBAIJAN SUMMARY ANALYSIS (June 2002), http://peps.ihsenergy.com/ (follow "new user" hyperlink; then follow "PEPS" hyperlink); *infra* Appendix I, The Oil and Gas Law of the Azerbaijan Republic: Parliament Commission Draft, art. 13 (2000) (Barrows Supp. No. 43, Russia & NIS).

158. *Infra* Appendix I, Petroleum Law No. 9778, art. 21 (1997) (Braz.) (PEPS).

159. *Infra* Appendix I, Model Contract for Third Onshore Bidding Round 1995 plus Annex, art. 11.7 (P.R.C.) (PEPS), Model Contract for Fourth Offshore Bidding Round 1992 plus Annex, art. 11.7 (P.R.C.) (PEPS).

Colombia: Until the last day of 2003, the national oil company, Ecopetrol, was authorized, subject to the approval of the Minister of Mines and Energy, to enter into contracts with oil companies.[160] On January 1, 2004, Ecopetrol's regulatory powers with respect to the acreage not held by Ecopetrol as of December 31, 2003, were transferred to the newly established National Hydrocarbons Agency (ANH).[161] Ecopetrol will continue to have regulatory powers with respect to acreage under contract as of December 31, 2003, and also with respect to acreage in which it was operating as of December 31, 2003.[162] It is not clear what will happen in the future with respect to unitization of structures lying under several contracts in which Ecopetrol is a party on some of the acreage or with respect to structures lying under acreage regulated by both Ecopetrol and ANH.

Ecuador: Petroecuador, the national oil company, is authorized to sign unitization agreements. The contract must be approved by the Minister of Energy and Mines and formally registered in the Hydrocarbon Register of the National Bureau of Hydrocarbons. The parties to the contract are jointly liable to the Ministry of Energy and Mines.[163]

Egypt: The Egyptian General Petroleum Corporation has the authority to approve unitization agreements in Egypt. The concession agreements are negotiated by the Agreements Department of the Egyptian General Petroleum Corporation and become effective upon signature by the Minister of Petroleum.

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160. *See* PETROLEUM ECON. & POLICY SOLUTIONS, IHS ENERGY, LEGAL, FISCAL & CONTRACTUAL TERMS: COLOMBIA SUMMARY ANALYSIS (July 2001), http://peps.ihsenergy.com/ (follow "new user" hyperlink; then follow "PEPS" hyperlink).

161. Agencia National de Hidrocarburos – ANH Homepage, Historia, http://www.anh.gov.co/html/i_portals/index.php (last visited Feb. 9, 2006).

162. The National Hydrocarbons Agency (ANH) is an administrative agency of the government established by Decree 1760 of June 26, 2003. Agencia National de Hidrocarburos – ANH Homepage, http://www.anh.gov.co/html/i_portals/index.php (last visited Feb. 9, 2006) (follow "Decree 1760 of 2003" hyperlink for Act text).

163. *See infra* Appendix I, Hydrocarbon Operations Rules, art. 51 (2002) (Ecuador) (PEPS), Operating Agreement for the Unified Production of a Common Deposit, cls. 1.2, 2.9 (2003) (Ecuador).

The agreements require ratification by the People's Assembly to become effective.[164]

Nigeria: PSCs awarded to foreign oil companies in the 1990s were entered into between the Nigerian National Petroleum Company (NNPC) on behalf of the state and the foreign oil company as contractor. The contract was then ratified by the Minister. Under the 2000 Guidance Notes for Prospective Bidders, licenses are granted directly by the Ministry to oil companies, whether foreign or Nigerian.[165]

Russia: While no provisions specific to unitization in Russia were found, Russian federal laws on the subsoil and the 1995 law on production sharing agreements provide some guidance as to the approval authority for petroleum operations. The Federal Ministry of Natural Resources houses the federal licensing agency called the State Committee on Geology and Subsoil Use (Roscomnedra). The Ministry and the relevant regional authorities represent the Russian Federation in production sharing contracts signed with contractors. If the contract area lies offshore on the continental shelf or in Russia's exclusive economic zone, then the Russian legislature must approve the agreement, in addition to the local authority with jurisdiction over the onshore operations base for the offshore activities. Royalty or tax licenses are granted jointly by federal and local authorities. In short, contractors usually must deal with more than one level of government in developing oil and gas resources in Russia.[166]

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164. PETROLEUM ECON. & POLICY SOLUTIONS, IHS ENERGY, LEGAL, FISCAL & CONTRACTUAL TERMS: EGYPT SUMMARY ANALYSIS (Mar. 2002), http://peps.ihsenergy.com/ (follow "new user" hyperlink; then follow "PEPS" hyperlink); *see infra* Appendix I, Decree 758 of 1972, art. 45 (Egypt).

165. PETROLEUM ECON. & POLICY SOLUTIONS, IHS ENERGY, LEGAL, FISCAL & CONTRACTUAL TERMS: NIGERIA—PRODUCTION SHARING SUMMARY ANALYSIS (July 2001), http://peps.ihsenergy.com/ (follow "new user" hyperlink; then follow "PEPS" hyperlink).

166. PETROLEUM ECON. & POLICY SOLUTIONS, IHS ENERGY, LEGAL, FISCAL & CONTRACTUAL TERMS: RUSSIA—PRODUCTION SHARING AGREEMENTS SUMMARY ANALYSIS (Nov. 2001), http://peps.ihsenergy.com/ (follow "new user" hyperlink; then follow "PEPS" hyperlink).

United Kingdom: The licensing authority is the Oil and Gas Directorate within the Department of Trade and Industry (DTI).[167] There is no requirement for DTI approval of a unitization agreement as such, only for an agreed and optimum "Field Development Programme."[168]

Yemen: There is no information with respect to approval for unitization purposes. The Minister of Oil and Mineral Resources (MOMR) executes PSAs on behalf of the state. Each contract is subject to ratification by the legislature before it takes effect. The Petroleum Exploration and Production Board (PEPB) is the division of MOMR responsible for contract negotiation and award.[169]

M. Unique Provisions

Some countries have unique provisions on particular aspects of unitization which are highlighted here, by sub-issue and by country:

1. Appointment of the Unit Operator

Ecuador *(2002 Model Production Sharing Contract)*: Ecuador has a unique provision in Clause 8.8.5 of its 2002 Model PSC for appointing the operator of the unitized project.[170] (It is not clear if this Clause applies only to a provisional unitization agreement or to a definitive one.) A contractor has a preferential option to be the operator of the common reservoir if one of the following is true:

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167. *See* Petroleum Act, 1998, c. 17, § 3(1) (Eng.); PETROLEUM ECON. & POLICY SOLUTIONS, IHS ENERGY, LEGAL, FISCAL & CONTRACTUAL TERMS: UNITED KINGDOM (ONSHORE) SUMMARY ANALYSIS (June 2002), http://peps.ihsenergy.com/ (follow "new user" hyperlink; then follow "PEPS" hyperlink).

168. *See infra* Appendix I, DTI OIL & GAS DIRECTORATE—REGULATION GUIDANCE NOTES.

169. PETROLEUM ECON. & POLICY SOLUTIONS, IHS ENERGY, LEGAL, FISCAL & CONTRACTUAL TERMS: YEMEN SUMMARY ANALYSIS (Mar. 2002), http://peps.ihsenergy.com/ (follow "new user" hyperlink; then follow "PEPS" hyperlink)

170. *Infra* Appendix I, Model Production Sharing Contract, cl. 8.8.5 (2002) (Ecuador) (PEPS).

- it discovered the reservoir;
- if another contractor has executed a gas contract when the common reservoir is a crude oil reservoir;
- if more than fifty percent of the reserves of the common reservoir are within its contract area; or
- if the contractor's development plan for the common reservoir shows that it can be developed and produced as soon as possible with maximum efficiency and economy.

2. What the Unitization Agreement Must Contain

Two countries' provisions provide a list of items that a unitization agreement must contain:

Brazil *(2003 Model Concession Agreement)*: The agreement must:

- equitably contemplate the rights and obligations of parties;
- define the unit area;
- name the operator;
- define the participation of each contractor;
- define the development plan and deadline to present the plan to ANP (the National Petroleum Agency);
- define the payments for government and third-party participation, based on specified amounts in the respective contracts for each contractor;
- include any other aspect usually in agreements of this kind, including Oil Industry Best Practice.[171]

Ecuador *(2002 Model Production Sharing Contract)*: Clause 8.8.6 of Ecuador's 2002 Model PSC requires that the unitization operating agreement contain, among other items, the following:

- well spacing, production rates, monitoring of pressures and production tests, and estimates of proven reserves;

171. *Infra* Appendix I, Model Concession Agreement (5th ANP Round), cl. 12.2 (2003) (Braz.) (PEPS).

- the economic participation of the parties in the development and start up of production;
- updating of proven reserves and other operating conditions of the common reservoir;
- procedures for adjusting sharing percentages, investments, and costs in accordance with this updating of reserves and conditions;
- procedure for changing the operator, provided that the change does not negatively affect the continuity of operations with maximum efficiency and economy;
- obligations of the operator;
- establishment and functions of the Unit[ized] Operating Committee to manage and supervise operations of the common reservoir; this Committee is to consist of representatives of the parties concerned and of Petroecuador, as applicable; and
- obligation of the operator to contract for insurance to protect the assets of the unitized area, to the satisfaction of the nonoperators.[172]

Ecuador is the only country in the survey that has promulgated a Model Unitization Agreement (called the "Operating Agreement for the Unified Production of the Common Deposit").[173] Surprisingly, the Agreement does not appear to contain some of the required provisions listed above. For example, the Agreement does not have procedures for changing the operator, for adjusting sharing percentages, or for well spacing and production rates. The Agreement does contain many provisions about the Unit[ized] Operating Committee (referred to in the Agreement as the "Shared Management Committee") used to supervise the unit's operations.

172. *Infra* Appendix I, Model Production Sharing Contract, cl. 8.8.6 (2002) (Ecuador) (PEPS).

173. *See infra* Appendix I, Operating Agreement for the Unified Production of a Common Deposit (2003) (Ecuador).

3. Joint Exploration and Drilling under a Service Contract

Nigeria: The 1979 Service Contract between a Private Company (name confidential) and Nigeria National Petroleum Corporation (NNPC) is highlighted here because it is the only service contract in the assembled legal materials on unitization. Article 10 provides for joint exploration and production operations between a service contractor and a licensee or lessee, or between two service contractors, when a structure or prospect straddles the boundaries between contract areas.[174] The Article provides for jointly financing the drilling of the first exploratory well and then moving to a unitization agreement if the parties agree that the exploratory effort results in a commercial discovery.[175]

4. Provisions Dealing with International Boundaries

United Kingdom: Section 26 of the U.K.'s 1999 Model Contract is unique (within the context of the regulations reviewed here) in addressing oil and gas development when an oil field's boundaries extend beyond the Minister's jurisdiction, presumably because the field has extended into another country. In this event, if the Minister believes that it is expedient that the oil field be developed as a unit in cooperation with all other persons having an interest in the field, the Minister may give notice in writing to the Licensee of "such directions as the Minister may think fit, as to the manner in which the rights conferred by this license shall be exercised."[176] The licensee must then obey the directions, which may add to, vary, or revoke the provision of a development scheme. This exceedingly open-ended regulation places enormous discretion in the Minister, but appears not to have caused great concern to private investors in a country that has followed the rule of law and due process for centuries.

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174. Nigeria's Service Contract, *supra* note 82, art. 10.2.

175. *Id.*

176. *Infra* Appendix I, Petroleum (Current Model Clauses) Order § 26(1) (1999) (U.K.) (PEPS).

N. Conclusions and Best Practices

This comparative overview of the different unitization provisions in the twelve countries chosen for analysis should suffice to alert the reader to the necessity of reading the actual unitization provisions in Appendix I. The provisions generally share the essential features of unitization as practiced in the United States, but they also often differ in details that can be important. Based on the "good, the bad, and the ugly" of the extensive experience with unitization in the state conservation commissions of the United States, perhaps one can summarize the "best practices" to look for in a legal framework for unitization:

- Enact a unitization statute, regulation, or model contract that expressly recognizes the public interest in unitizing to prevent physical and economic waste. Then, if these purposes are met:
  - allow early unitization, even in the exploratory phase;
  - allow unitization for both oil fields and gas fields;
  - allow unitization of more than one field, strata, or reservoir;
  - allow the private parties to attempt to unitize voluntarily before imposing compulsory unitization;
  - require defined and reasonable time periods for host-government approval of the unitization agreement through an expert agency; and
  - require arbitration if the parties cannot agree voluntarily.

III. OTHER CONTRACTS RELEVANT TO THE LEGAL FRAMEWORK OF UNITIZATION

The previous Part of this Article analyzed in some detail the requirements set forth in laws, regulations, and host-government contracts regarding unitization. Although these provisions establish the bulk of the legal framework for unitization in most countries, the existing private contractual regime applicable to one or more of the blocks to be unitized can have a significant impact as well. The most significant of these contracts are (i) operating agreements, (ii) farmout and

acquisition agreements, and (iii) production sales contracts, each of which will be discussed in some detail below.

A. Operating Agreements

When more than one company holds rights in the same host-government contract granting exploration, development, or production rights, the parties typically enter into an operating agreement to address their respective rights and obligations regarding exploration, development, and production and to appoint a single operator to carry out these activities on behalf of all of them.[177] Such operating agreements vary in size and scope, but in all cases of which the Authors are aware, they contain sections addressing the conduct of petroleum operations on the relevant block, the appointment of a single operator to conduct operations, and collective decisionmaking. Operating agreement provisions addressing these subjects will have an effect on any proposed unitization with the holders of a neighboring host-government contract.

1. Conduct of Petroleum Operations

The existing operating agreement for each block will cover all petroleum operations on that block, including operations on the field to be unitized. The Model Form International Operating Agreement promulgated by the AIPN, the most commonly used form of operating agreement outside of North America and Europe, states in its 2002 version (the "2002 Model JOA") that the scope of the agreement covers the following:

> [T]he respective rights and obligations of the Parties with regard to . . . the [host-government] Contract, including the joint exploration, appraisal, development, production and disposition of Hydrocarbons from the Contract Area.[178]

The existing operating agreement will consequently need to be amended (either directly or through the unitization agreement) to supercede its role in the area subject to

177. *See* Kramer & Conine, *supra* note 17, at 561–62.

178. ASS'N INT'L PETROLEUM NEGOTIATORS, MODEL FORM INTERNATIONAL OPERATING AGREEMENT, art. 3.1(A) (2002) [hereinafter 2002 MODEL JOA].

unitization in order to allow the unitization agreement to control operations in the unitized field. Where the unitization only covers certain substances[179] or certain depths,[180] the existing operating agreement will continue to have relevance in the unitized area with respect to substances and depths that are not unitized. In such cases, the unitization agreement will need to specify the manner in which the existing operating agreement and operator will interact with the unitization agreement and unit operator.[181]

2. Operator

The 2002 Model JOA states the following with regard to the operator:

> Operator shall have all of the rights, functions and duties of Operator under the [host-government] Contract and shall have exclusive charge of and shall conduct all Joint Operations.[182]
>
> . . . .
>
> . . . Subject to the Contract and this Agreement, Operator shall determine the number of employees, contractors, consultants and agents, the selection of such persons, their hours of work, and the compensation to be paid to all such persons in connection with Joint Operations.[183]

As this text demonstrates, the position of operator can be an important one, allowing the company that holds that position to exert substantial control over the technical conduct of operations as well as determining the staff who are employed in those operations. Depending upon the terms of the accounting procedure that is attached to the operating agreement, the position of operator can also be financially advantageous by allowing the operator to pass through in-country headquarters

179. *See supra* subpart II.F.

180. *See supra* subpart II.G.

181. *See* discussion *infra* subpart V.H.

182. 2002 MODEL JOA, *supra* note 178, art. 4.2(A).

183. *Id.* art. 4.3, Alternative No. 1.

costs and home-office overhead costs to the other participants.[184] As a result, companies holding an operatorship position are loath to surrender that position, and typically cannot be required to do so merely as a result of a unitization.[185] When two neighboring blocks are unitized, however, a single operator will need to be appointed; otherwise, some of the key benefits of jointly operating a single field will be lost. Consequently, one of the most significant issues in a unitization is which company will be the operator, and this generally must be settled through negotiation, unless the host-government contract dictates the choice of operator[186] or the host government dictates the terms of the unitization.[187]

3. Collective Decisionmaking

Most operating agreements outside of the United States establish a voting mechanism pursuant to which the participants make collective decisions through an operating committee. The committee's decisions regarding petroleum operations on the block become binding upon all of the parties.[188] The 2002 Model JOA, for example, includes the following voting provisions:

> Except as otherwise expressly provided in this Agreement, all decisions, approvals and other actions of the Operating Committee on all proposals coming before it shall be decided by the affirmative vote of _____ (_____) or more Parties which are not Affiliates then having collectively at least _____ percent (___%) of the Participating Interests.[189]

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184. ASS'N INT'L PETROLEUM NEGOTIATORS, MODEL FORM INTERNATIONAL ACCOUNTING PROCEDURE § 2, at 13, § 2.4, at 15 (2004).

185. *See, e.g.*, 2002 MODEL JOA, *supra* note 178, art. 4.10.

186. *See supra* subpart II.M.1 (describing the appointment of the unit operator in Ecuador's 2002 Model PSC).

187. *See supra* subpart II.K (describing the procedures of various countries that lead to unitization as a result of a failure to unitize or secure approval of a unitization plan).

188. Exceptions are typically allowed for physical operations such as drilling wells, in which a participant may elect not to participate, notwithstanding the approval of the operation by a majority vote. *See, e.g.*, 2002 MODEL JOA, *supra* note 178, art 5.13(B).

189. *Id.* art. 5.9, Alternative No. 1.

However, certain decisions have historically been outside the scope of such voting mechanisms. Unitization has often been one of those decisions because a unitization decision, which involves acquisition of rights outside of the block, goes beyond the scope of petroleum operations on the block which are normally covered by an operating agreement. Unitization effects a surrender of an undivided share of each participant's rights with respect to its host-government contract in exchange for a grant of rights with respect to the host-government contract for the neighboring block.[190] If unitization is beyond the scope of the operating agreement's voting mechanism, then unanimous approval of the participants must be obtained to unitize, which can complicate negotiations.[191]

In typical cases where the applicable host-government contract or laws allow the government to compel each participant to unitize,[192] such complications may ultimately be overcome, but not necessarily in a manner desired by the majority of the participants.

B. Farmout and Acquisition Agreements

In many cases, the participants holding interests in a host-government contract do not acquire them directly from the host government, but instead acquire them by purchase or farm-in from another participant. The terms of the documentation for such transactions vary, but they sometimes contain obligations on the part of the acquiring party to bear a disproportionate share of the costs of certain future operations, grant priority to the existing or the acquiring party for the recovery of its costs out of production, or create a special allocation of tax benefits. In most cases, these provisions are drafted before any of the participants are aware that the field may be unitized, so they typically refer to costs incurred and tax benefits resulting from

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190. *But cf.* 2002 MODEL JOA, *supra* note 178, art. 3.1(B)(4) (obliquely including a unitization decision within the scope of the agreement by excluding unitization from the list of exclusions).

191. Even if unitization is allowed as a decision within the scope of the operating agreement, the same problem will arise if the operating agreement provides that a vote to unitize must be unanimous.

192. *See supra* subpart II.K.

operations on the particular block and to production or proceeds of production from the particular block.[193] As a result, it may be unclear whether the obligations and rights under the farmout agreement or acquisition agreement apply to unit costs and unit production, including an allocated share of costs and production from the neighboring block.[194] Thus, the farmout agreement or acquisition agreement may need to be amended at the time of unitization to avoid a future dispute. Similar concerns apply when a company or individual has been granted an overriding royalty or other nonpossessory interest with respect to the original block, whether as part of a farmout or otherwise.

C. Production Sales Contracts

Although in some cases the field to be unitized is the first discovery on a block, in other cases other fields have been discovered earlier. The production sales contract for these fields may contain dedications of all natural gas (or, less frequently, all crude oil) from the block, including gas from future discoveries, to the purchaser. Seldom do these dedications address the possibility of a future unitization,[195] so it will likely

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193. For example, on participation agreement related to a block in China reads, "The Parties will share Petroleum *(as defined in the Contract)* to which the Contractor is entitled under Articles ___ and ___ *of the Contract* in accordance with the procedures described in Article XIX of the 1995 ASS'N INT'L PETROLEUM NEGOTIATORS, MODEL FORM INTERNATIONAL OPERATING AGREEMENT (emphasis added).

194. For example, see *Mengden v. Peninsula Prod. Co.*, 544 S.W.2d 643, 647 (Tex. 1976), in which the Texas Supreme Court overruled two lower courts' determination that payout under a farmout agreement should be calculated without regard to a subsequent unitization. The supreme court stated "that, in the absence of an express provision to the contrary in the subsequent assignments or farmout agreements," the farmout agreement should be interpreted to take into account only the allocable share of production to which the applicable lease was entitled under the unitization. *Id.*

195. For example, one gas sales contract covering a block in West Africa contains the following restriction:

> Except for Suppliers Priority Commitments and the Gas sales and delivery commitments under this Agreement, no Supplier . . . shall . . . sell, flare or otherwise dispose of any portion of Gas produced from the ____ Block unless and to the extent that . . . the quantities of Gas projected to be produced from the ____ Block . . . plus . . . the quantities of Buyer Additional Gas committed to be available to Buyer . . . [less] the quantities of Gas projected to be used and delivered under the Suppliers' Priority Commitments . . . would reasonably be expected to exceed the quantities of Gas from the ____ Block

be unclear whether the purchaser has the rights to the production to which its sellers become entitled from the other blocks in the unitized field, or whether the purchaser has some claim over the share of production in its original block to which the parties in the other unitized blocks become entitled.

Restrictions on transfer of production rights contained in some production sales contracts may magnify this problem.[196] These restrictions typically take the form of a requirement that any transferee assume and agree to be bound by the terms of the production sales contract. The participants in the adjoining block will undoubtedly dispute any assertion by a gas purchaser that they need to ratify its contract, and a waiver from the purchaser or an amendment of the production sales contract may be required.

IV. DOCUMENTING THE UNITIZATION

In the United States and Canada, unitizations have traditionally been documented by two agreements: a unit agreement that sets forth the basis for sharing costs and production, and a unit operating agreement governing day-to-day operations.[197] Outside the United States and Canada, however, unitizations are typically documented by a single, combined unitization and unit operating agreement, often preceded by a pre-unitization agreement.

A. Pre-Unitization Agreements

Because of the complexity of unitization and the time consumed negotiating a full unitization agreement, participants in the blocks to be unitized may enter into a pre-unitization agreement to allow preliminary work to be conducted while negotiations are proceeding. This preliminary work often consists of joint technical studies designed to help determine the

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required to allow delivery of the ____ [Annual Contract Quantity] ACQ during each remaining Contract Year through the end of the Term.

196. Such restrictions often appear in documentation relating to projects that require a dedicated supply of gas, such as liquefied natural gas projects, methanol projects, and ammonia projects located away from any gas pipeline network.

197. *See, e.g.*, 1 KRAMER & MARTIN, *supra* note 27, § 17.02[4], at 17-16.2.

extent of the field or reservoir to be unitized and the quantities of oil and gas in that field or reservoir that underlie each block (which will be used to determine relative tract interests, as described below in subpart V.D) and may include the drilling of jointly-funded wells. Pre-unitization agreements sometimes appoint an initial unit operator to conduct this work and, regardless of whether an initial unit operator is appointed, will generally authorize the party conducting the work to charge the applicable costs to all parties based on an interim allocation. The interim cost allocation will be adjusted following unitization.

The size and scope of pre-unitization agreements varies enormously; there is no standard form. Two examples reviewed by the authors illustrate this difference. The first example, for a unitization in Indonesia, was fourteen pages long and covered the following main subjects:

- reimbursement of certain data acquisition costs;
- drilling of a jointly-funded well to determine the field extent near the block boundary and payment of the costs of that well;
- exchange of data;
- principle on which unit interests will be calculated;
- premium for one block to participate in the unit;
- principles for the unitization agreement;
- principles governing certain downstream activities;
- further drilling to be conducted on one of the blocks by the block operator; and
- confidentiality and dispute resolution.

The second example, for a unitization in Papua New Guinea, was fifty pages long (plus annexes) and covered the following main subjects:

- scope of agreement, including data exchange, further studies, preliminary acquisition of materials and services, preparation of a development plan and negotiation of a unitization agreement;
- preliminary percentage interests for purposes of cost sharing, with a recognition that these may be retroactively adjusted;

- pre-unitization agreement's superseding of individual operating agreements for actions within its scope;
- formation of a pre-unitization committee for setting policies, approving budgets, etc.;
- appointment of an operator for pre-unitization operations;
- adoption of a contracting plan for approval of front-end engineering and other early work;
- work programs and budgets;
- payment of costs and cash calls;
- requirement to prepare and negotiate a unitization agreement (but providing few principles for that agreement);
- adoption of a Development Plan and conditions precedent to the Development Plan;
- exchange of data; and
- confidentiality, dealings with government, public announcements, and dispute resolution.

Pre-unitization agreements terminate upon execution by the parties of a definitive unitization agreement.

B. Unitization Agreements

The key issues in unitization agreements are discussed in some detail in Part V of this Article, so this subpart will address only the purpose and overall structure of these agreements and their role in payment of each block's fiscal obligations to the host government.

As mentioned above, in the United States and Canada, two agreements are traditionally used: a unit agreement to form the unit and set forth the basis for sharing costs and production, and a unit operating agreement to govern day-to-day operations.[198]

198. *See*, *e.g.*, U.S. Minerals Management Service, 30 C.F.R. § 250.1301 (2006) (requiring both a unit agreement to "allocate benefits to unitized leases, designate a unit operator, and specify the effective date of the unit agreement" and a unit operating agreement to "describe how all the unit participants will apportion all costs and liabilities incurred maintaining or conducting operations").

One reason for the use of two agreements is that on private lands in the United States, the typical oil and gas lease rarely authorizes the lessee to unitize a leased tract, so a unit agreement signed by the lessors is required to unitize voluntarily. Moreover, all compulsory unitization statutes in the individual states require that a supermajority of lessors sign a unit agreement voluntarily before compulsory process can be authorized by the conservation commission.[199] The typical lessor in the United States will not see the second agreement, the unit operating agreement, which is signed by the lessees to govern the relationship between them as working-interest owners.

Outside the United States and Canada, however, the unit agreement and unit operating agreement are typically combined into a single document which may be referred to as a "unitization and unit operating agreement" or simply as a "unitization agreement." This approach is feasible in international practice because there is no need to join a number of lessors in a separate unit agreement; instead, the host government (the sole "lessor") generally approves the unitization by means of an approval letter or other official document. The use of a single unitization agreement allows the parties to avoid potential overlap or conflict between two separate agreements, but it also results in submission of all of the detailed operating agreement terms to the host government for approval, when such approval of unitization by the host government is required.[200]

Although there are a number of model forms of unitization agreements that have been prepared for use in certain countries or certain situations,[201] no model has been prepared for general international use.[202] A "model" unitization agreement for

199. Eckman, *supra* note 48, at 358.

200. *Compare, e.g.*, *infra* Appendix I, Model Concession Agreement (5th ANP Round) (2003) (Braz.) (PEPS) (providing that if the ANP does not approve the agreement proposed by the parties, development and production may be suspended), *with* 30 C.F.R. § 250.1301 (stating that in most cases government approval of the unit operating agreement is not required).

201. *See* 3 KRAMER & MARTIN, *supra* note 27, §§ 29.01–29.07, at 29-4 to 29-238.83.

202. The AIPN has, however, begun preparing such a model. ASS'N OF INT'L PETROLEUM NEGOTIATIONS, CONTRACTS IN DEVELOPMENT: UNITIZATION AGREEMENT, *available at* http://www.aipn.org/modelagreements/development.asp.

international use could be expected to cover the following major subjects:

(i) terms;

(ii) creation and effect of unit, including among other issues: (A) area, depths, and substances unitized; (B) allocation of production and costs to the individual blocks; (C) supremacy of the unitization agreement over existing block operating agreements; (D) responsibility of blocks for royalty, income tax, and other burdens (such as overriding royalties) on allocated production; (E) treatment of prior costs and pre-existing wells, materials, and data; (F) treatment of discoveries that overlap unit boundaries; and (G) where all depths or substances are not unitized, treatment of nonunit discoveries;

(iii) tract and unit interests, including among other issues: (A) the means for changing the unit area; (B) redetermination of tract and unit interests; (C) clarification that depletion of the reservoir does not change tract or unit interests; and (D) treatment of separate agreements affecting allocations between the parties, such as farmouts;

(iv) nonunit operations within the unit area, where all depths and substances are not unitized, including among other issues: (A) conduct; (B) approvals; (C) financial responsibilities of the relevant block; (D) priority of unit operations; (E) protection of unit reservoir; and (F) use of unit assets and capacity in unit facilities;

(v) unit operator, including among other issues: (A) rights and duties; (B) delivery of information; (C) award of contracts; (D) settlement of claims and suits; (E) representation of the parties before the government; (F) resignation, removal, and replacement; and (G) liability;

(vi) unit operating committee, including among other issues: (A) function; (B) subcommittees; and (C) voting passmarks (by individual party or by block);

(vii) development plans and budgets, annual operating budgets, and incorporation into individual block budgets submitted to the host government;

(viii) payments, accounting, and audit;

(ix) default, including among other issues: (A) whether financial effects are borne by the block where the defaulting party's interest originated or by all nondefaulting parties; (B) consequences suffered by the defaulting party(ies) (including treatment of such parties' underlying block interest); and (C) the effect of default provisions in the relevant block operating agreement;

(x) marketing and sale of unit production, including among other issues: (A) lifting arrangements; (B) right and obligation to take in kind; and (C) joint sales (where applicable);

(xi) maintenance of underlying host-government contracts and effects of loss;

(xii) abandonment and security for abandonment;

(xiii) assignment, including among other issues: (A) limitations on assignment; (B) requirement that underlying block interest also be transferred; and (C) the effect of any restrictions and rights (such as preferential rights) in the block operating agreements relating to transfer;

(xiv) withdrawal, including among other issues: (A) description of the parties entitled to receive the withdrawing party's interest (parties in the same block versus all unit parties); (B) any obligation to also withdraw from the underlying block operating agreement and host-government contract; and (C) liabilities and obligations of the withdrawing party;

(xv) confidentiality and intellectual property;

(xvi) force majeure;

(xvii) applicable law and dispute resolution; and

(xviii) notices, public announcements, conflict of interest, ethics, etc.

Many of these subjects are also addressed in operating agreements. In a unitization agreement, however, additional

aspects must be addressed as a consequence of imposing the unitization agreement on top of existing host-government contracts and operating agreements. Provisions such as those described in items (ii), (iii), and (iv) above are unique to unitization agreements.

As mentioned in Part II of this Article, a host government with unitization laws or regulations, or unitization provisions in its model contract, will generally require that it approve any unitization agreement. The primary reason for this requirement is control over the fiscal benefits to the country, which are obtained through block-specific contracts and depend upon the production and costs attributable to each block. The unitizing companies have an interest in obtaining host-government approval for the unitization as well, in order to receive assurance that the companies' allocations of production and costs between blocks will be respected for purposes of determining royalty payments and production shares for each block, determining taxable income and tax deductions for each party, and determining host-government payments to purchase a working interest in each block, where the host government purchases such an interest through a payment out of production. That assurance may not be as solid as desired, given the lack of clear guidance on this question in many host-government laws and regulations.[203]

V. KEY ISSUES IN UNITIZATION AGREEMENTS

The legal framework laid out in the prior Parts of this Article sets the stage for unitization, but in almost all cases in international practice (apart from some cross-border unitizations), the terms of unitizations are set principally by unitization agreements negotiated between block participants. This Part analyzes key issues in unitization agreements that are different from those faced in other forms of operating agreements. This Part also notes how those key issues were addressed in the Sample Unitization Agreements reviewed.

As discussed in Part IV, there presently is no prevailing model unitization contract for use outside of North America and

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203. *See supra* subpart II.I.

the North Sea, so the following discussion of certain key issues in unitization agreements is based upon the personal experiences of the Authors obtained from working on unitization agreements around the world and from a study of eleven unitization agreements in the following jurisdictions: Algeria (1), East Timor-Australia (1), Ecuador (1), Indonesia (4), Norway (1), Papua New Guinea (1), United Arab Emirates (1), and United Kingdom (1). The number in parentheses is the number of agreements from that jurisdiction.

A. Unit Area

Once it has been determined that a petroleum reservoir crosses block boundaries and should be unitized, an initial question for the contractor parties in each block will be the area in each block that should be included in the unit.

1. Areal Extent

The surface area of the unit is likely to be based upon the contractor parties' understanding of the areal extent of the reservoir or reservoirs to be unitized. That understanding will often be based primarily upon seismic data, with confirming well data from exploration and appraisal wells drilled in the reservoir. In some cases, a condition of the unitization will be the drilling of one or more additional appraisal wells to better define the reservoir boundary. Because there will always be some uncertainty as to the exact reservoir boundary, parties to a unitization often include a buffer zone around the predicted unit boundary within the area of the unit to minimize chances that the reservoir will later be determined to extend outside of the unit. If the buffer zone is made too large, however, there is a greater chance that it will inadvertently pick up a portion of another reservoir that is not discovered until after the unit is formed. Some unitization arrangements, such as those in the U.S. Outer Continental Shelf, attempt to resolve this issue by creating a large unit area, while providing for the sharing of costs and production within smaller participating areas that contain single reservoirs inside the unit area.[204] A unit area may

204. *See generally* 1 KRAMER & MARTIN, *supra* note 27, § 17.01, at 17-5 to 17-8.

intentionally include multiple fields if there are reasons other than the management of the individual reservoirs for unitizing them, such as sharing surface infrastructure or supplying a single downstream project. As noted above in subpart II.G, the governments of Angola, China, the United Kingdom, and Nigeria have expressly recognized this possibility in one form or another, but in some jurisdictions a multi-reservoir unit may face intense government scrutiny because of its novelty.

2. Depth

If the unit is intended to cover a single reservoir, the most logical unit area is an area limited to the three-dimensional boundaries of the reservoir. International practice often follows this logic and uses both depth and areal extent to define the unit in the unitization agreement. Of the eleven Sample Unitization Agreements examined, seven were limited to specified reservoirs or depths, two had no depth limitations, and two could not be analyzed as a result of insufficient information. Note that this international practice contrasts with the development areas or production licenses granted under many host-government contracts, which often cover all depths. Those unit areas that encompass all depths within a designated surface area are susceptible to becoming multi-reservoir units if additional reservoirs are discovered at greater depth. This consequence makes it more likely that one or more parties will insist upon a redetermination right.[205]

3. Changes in Unit Area

Unit areas generally require revision only if it is discovered that a unitized reservoir or a new discovery within the unit area extends across the unit boundary. Many of the benefits of unitization may be lost if the owner of another block can develop and produce a portion of the reservoir without regard to the

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205. *See infra* subpart V.F. It is important to distinguish between the unitized reservoir, which is the subject of cost and production allocation, and the scope of the unit agreement, which will generally cover all activities within the areal extent of the unit, including the rights of licensees with respect to nonunit activities above and below the unit reservoir. *See infra* subpart V.C.

actions or interests of the unit parties. There are two principal ways to deal with a boundary overlap: (i) to extend the unit area to encompass the portion of the reservoir lying outside of the current unit area, or (ii) in cases where the overlap is the result of a newly discovered, separate reservoir, to exclude that reservoir from the unit. Either approach generally requires unanimous approval because it may be accompanied by a recalculation of the interests of each tract within the unit. However, one of the Sample Unitization Agreements examined gave unit parties holding a minimum percentage interest the right to require expansion of the unit area to include hydrocarbons in pressure communication with the unit reservoir. In such cases, if a dispute arises over the existence of pressure communication, it will usually be subject to resolution by an expert.

Upon an expansion in the unit area, the tract contributing the additional acreage typically receives an increased interest in the unit in exchange for the contribution of those reserves, while the interests of the other tracts in the unit are reduced accordingly. Similarly, a reduction in the unit area may affect the interests of the various tracts within the unit differently, though in some cases unit areas may be reduced without altering the tract interests of any tract (where reduction occurs as a result of relinquishment of acreage approved by the unit, for example). A unit area may also be voluntarily extended for reasons other than a boundary overlap, such as a desire to include additional reservoirs that will use common infrastructure or deliver their production to a common downstream project, but again, unanimous approval of the unit parties will typically be required.

B. Unitized Substances

1. Oil versus Gas

As noted in subpart II.F, oil and gas may be unitized independently of each other. This may be the result of regulatory constraints, as discussed in that subpart, but it may also be the result of the unitizing parties' determination that the reservoir primarily contains either oil or gas. In some

circumstances, the decision may be the result of the unitizing parties' determination that, although both substances are present in material quantities, only one of the substances overlaps the block boundaries and requires unitization (such as an oil reservoir with a gas cap located entirely within one block). In addition, oil and gas may both be unitized, but independently of each other, where the unitizing parties believe that there is a substantially different distribution of the two between the blocks.[206] Of the eleven Sample Unitization Agreements examined, seven unitized both oil and gas, three unitized only oil, and one unitized only natural gas and natural gas liquids.

A determination to unitize only one substance or to separately unitize the two substances leaves open the possibility of future disputes, however, because the parties' assumptions may be incorrect (for example, a unitized oil field may have a significant gas cap of which the parties were unaware at the time of unitization) or the parties may later disagree as to whether a substance is oil or gas, and therefore is unitized or not unitized. The latter problem arises when liquids are extracted from gas in various circumstances (natural condensation, mechanical separation, and/or cryogenic separation, to name a few).

Texas has a series of "white oil" cases which arose in the huge Panhandle field due to a unique circumstance: The rights to produce oil in this field were owned by one group of lessees, and the rights to produce gas belonged to another group. (The typical lease grants both oil and gas rights to a single lessee.) As the share of production consisting of gas increased over time, the oil operators were threatened with the loss of their leases. They installed refrigeration units at the surface of their wellheads to cool the stream of production emerging from the wells. The cooling process extracted liquid substances that had been in a gaseous state in the reservoir, flowing up the wellbore, and at the surface. Ultimately the Texas courts decided that the "white oil" liquid actually belonged to the gas lessees.[207]

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206. Note, however, that even in this circumstance, oil and gas can be jointly unitized by converting quantities of gas to a barrel of oil equivalent (or vice versa).

207. For a detailed discussion, see 1 SMITH & WEAVER, *supra* note 16, ch. 3.6(E), at 3-40 to 3-46.

To avoid this type of conflict, if oil and gas are unitized separately, the terms "oil" and "gas" should be specifically defined, with particular reference to the treatment of condensate and natural gas liquids.

2. Other Substances Used for Enhanced Recovery

If the unitization is being put in place to accommodate enhanced recovery operations for a reservoir, any substances to be injected into the reservoir (such as water or carbon dioxide) for enhanced recovery purposes should also be unitized if they are expected to be produced from one or more of the blocks being unitized. If this is not done, a long-term contract providing access to those substances should be executed at the time of unitization. Absent one of these alternatives, the unitization and enhanced recovery program could become a physical or economic failure, with the unit unable to institute the planned program on economic terms.

3. Diluent Used in Heavy Crude Oil Projects

Crude oil of very low API gravity (for example, below 17–20º API) may require injection of a diluent at the wellhead to allow it to flow through a pipeline. If the unitized reservoir consists of such heavy crude oil, the unitizing parties may want to consider whether the source of the diluent and related infrastructure should be unitized. Alternatively, a long-term contract could provide the unit with a secure source of diluent. Again, absent one of these actions, the unitization and development of the heavy crude oil field could become a physical or economic failure.

C. Effect of Unitization

Once a unit is formed, each separately owned tract that participates in the unit will be entitled to an undivided percentage of unitized production obtained in any unit operation, regardless of the tract from which it is produced, and will be liable for that same undivided percentage of costs and liabilities incurred in any unit operation, regardless of the tract to which they relate. That undivided percentage is described as the tract's "tract interest." The unit parties will endeavor to have the allocation of production and costs by tract interest

recognized by the host government for purposes of royalty and bonus payment obligations, production sharing and cost recovery, and taxes, and this intent will normally be reflected in the text of the unitization agreement. As noted above in subpart II.I, existing host-government laws and contracts rarely seem to provide adequate clarity regarding the treatment of these items upon unitization, so host-government approval of the unitization agreement may be the unit parties' best opportunity to obtain that clarity. All materials, equipment, facilities, data, and other assets that are acquired for unit operations after the effective date of the unitization will become the joint property of all unit parties, in proportion to their respective unit interests, except to the extent the host government takes ownership under applicable law and the terms of the host-government contract. Conversely, existing materials, equipment, facilities, data, and other assets generally remain the property of the individual tracts except to the extent the unitization agreement provides for their contribution to the unit.[208]

The unitization agreement will generally state that after the effective date of unitization, the unitization agreement will control in place of the existing tract operating agreements with respect to all unit operations. Without such pre-emptive control by the unitization agreement, the benefits of a single, coordinated operation of the unit reservoir discussed in subpart I.A of this Article would be lost. For nonunit operations,[209] the tract operating agreements will remain in effect, except to the extent expressly modified by the unitization agreement. In addition, the tract operating agreements will often have subsidiary application for matters that must be handled on a tract basis, such as submission of budgets to the host government, or that the unit parties desire to handle on a tract basis, such as assignment approvals, preferential rights to purchase, withdrawal, and default. The principal reason for handling the latter items on a tract-by-tract basis is to avoid providing one tract with a right to acquire interests in the other,

208. *See infra* subpart V.D.3.

209. *See infra* subpart V.H.

which might alter carefully negotiated voting rights and alignments of interest. In the case of responsibility for defaults, each tract may also wish to avoid taking the credit risk of the participants brought to the unit by the other tract.

One subject that is sometimes overlooked in unitization agreements is the transition from ongoing operations under the existing tract operating agreements to operations under the unitization agreement. Some previously approved budget items and authorizations for expenditure may need to be transferred from the tract operating agreements to the unitization agreement, particularly those representing work in progress on the unit area. Similarly, existing contracts entered into under the tract operating agreements that relate to operations that will become unit operations may need to be novated[210] from the tract operator to the unit operator. Finally, any assets and contracts acquired for the joint benefit of all unit parties pursuant to a pre-unitization agreement may need to be novated to the unit operator, if the unit operator was not acting as such during the pre-unitization period or if such assets and contracts were not clearly acquired for the benefit of all unit parties.

D. Determination of Tract Interests

Determination of tract interests within the unit is often one of the most contentious activities in a unitization.

1. Principal Basis for Tract Interests

Because the principal value contributed by each tract is the hydrocarbons that it contains, tract interests tend to be based primarily upon the hydrocarbons believed to underlie each tract. The most common bases for determining tract interests in unitizations outside of the United States and Canada seem to be (i) relative quantities of oil or gas in place under each tract, and (ii) relative quantities of recoverable reserves attributable to each tract. Of the eleven Sample Unitization Agreements examined, four determined tract interests based on proved

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210. Novation is "[t]he act of substituting for an old obligation a new one that either replaces an existing obligation with a new obligation or replaces an original party with a new party." BLACK'S LAW DICTIONARY 1091 (7th ed. 1999).

reserves, five determined tract interests based on oil or gas in place, and two could not be analyzed as a result of insufficient information. In the United States, in contrast, extremely complex formulae resulting from extensive negotiations among numerous working-interest owners may include such factors as well productivity, well density, reservoir penetration, and acre-feet of reservoir rock.[211] For relatively low-value unitizations in the United States, tract interests may be based simply on the surface acreage of each tract overlying the reservoir, because it may not make economic sense to study and negotiate a more detailed formula.

The contractor parties typically have freedom to negotiate and agree upon the bases for determining tract interests, subject to host-government approval of the unitization, because the host government rarely requires that a particular approach be taken.[212] Most of the bases for determining tract interests require extensive geological, geophysical, and reservoir engineering studies to help determine the most reliable figures based upon the available data. As noted above in subpart IV.A, the parties may conclude that there is insufficient data and that further data must be acquired before initial tract interests can be determined. Notwithstanding the very technical nature of these determinations, it is not unusual in practice to find the parties in each tract reviewing the different bases for determining tract participations, calculating which generates the largest tract interest for their tract, and then promoting that basis as the most scientific basis for determining tract interests.

2. Conversion Ratios Between Oil and Gas

If oil and gas are unitized together on the basis of either hydrocarbons in place or recoverable reserves, the quantities of the two will need to be combined for purposes of determining tract interests. This is traditionally done on the basis of estimated energy equivalency (such as the common approximation that one barrel of oil is the equivalent of six

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211. *See* 1 KRAMER & MARTIN, *supra* note 27, § 17.02[5][a], at 17-16.12 to 17-16.12(1), 17-18.

212. *See supra* subpart II.H.

thousand cubic feet of gas). If oil and gas are distributed differently on the tracts, the conversion ratio chosen can have a material effect on the resulting tract interests.

3. Pre-Unitization Costs

It would be extraordinary if the costs that each tract had incurred related to the unit area prior to unitization were exactly in proportion to its subsequently-determined tract interest in the unit. Often, one tract has spent more money for better data, more useable wells, and/or better existing infrastructure, such as pipelines and platforms. As a result, the tract or tracts that have spent in excess of their tract-interest share of such pre-unitization costs often request some equalization of those costs, either through a cash payment from the tracts that spent less than their tract-interest share or through an increased tract interest to reflect the benefits that the unit will receive. The other tracts will likely resist any attempt to include costs that do not prove useful for future unit operations, such as dry hole costs or costs of drilling wells to targets other than the productive unit reservoir. In addition, arguments may ensue over the relative efficiency of the prior operations on each tract; the contractors on a tract that have drilled three U.S. $1 million wells on their tract are unlikely to want to equalize costs (without some adjustment) with the contractors on a neighboring tract that have drilled three U.S. $3 million wells into the same reservoir. To receive an adjustment for pre-unitization costs, the benefited tracts will be expected to convey the useable assets derived from those pre-unitization costs to the unit, or to furnish the unit with capacity rights to use the existing infrastructure through a transportation agreement, production-handling agreement, or other contract.

4. Other Factors Affecting Tract Interests

The contractors of one or more tracts in a unit may wish to adjust the tract interests that would otherwise be determined using hydrocarbons in place or recoverable reserves because their tract or tracts have an inherently lower development cost than the tracts belonging to other parties for reasons unrelated

to pre-unitization expenditures as discussed above. These contractors are seeking to receive credit for the cost savings that the unit will enjoy. Such lower development costs can result from many factors, such as proximity to third-party infrastructure, shallower water depth, or a more accessible surface location.

E. Determination of Unit Interests

The unit interest of a party is determined by multiplying its participating interest in each tract by that tract's interest in the unit, and then adding the results. For example, if a unit is formed by two tracts, Tract 1 and Tract 2, having thirty percent and seventy percent tract interests in the unit, respectively, and Party A owns a ten percent interest in Tract 1 and a thirty percent interest in Tract 2, Party A's unit interest will be as follows:

Tract	Tract Participation (Y)	Party A Interest in Tract (Z)	Unit Interest (Y x Z)
1	30%	10%	3%
2	70%	30%	21%
	Party A Unit Interest =		24%

Unit interests will generally change only upon a change in tract interests[213] or a sale or other transfer of all or a part of a party's unit interest. However, in theory, the unit interests attributable to a tract could be altered arbitrarily established by the parties to that tract, based on other considerations such as special allocations to particular parties under farmout or carried interest arrangements or for other purposes, provided that the total of the interests equaled the agreed tract interest for the tract.

213. *See infra* subpart V.F.

F. Redetermination of Tract Interests

As noted in subpart V.D, determination of tract interests can require significant data and technical study, yet in many cases units are formed prior to the time a reservoir has been developed and has established a reasonable production history. As a result, initial tract interests are established in a climate of uncertainty, and one or more of the tracts involved in the unit may desire to adjust the initial tract interests once additional data have been obtained. The adjustment may or may not be coupled with an expansion of the unit area based upon the additional data.[214] Any such subsequent adjustment in tract interests is termed a "redetermination." All eleven Sample Unitization Agreements examined provided for one or more redeterminations.

1. Basis for Redetermination

If the unitizing parties are comfortable with the use of a particular basis for determining tract interests, then the redetermination of those tract interests will typically be done on the same basis. In some cases, however, parties may agree to set initial tract interests on a more general basis, such as acre-feet of reservoir rock, and then redetermine based on a more precise basis, such as recoverable reserves, after the necessary data are available.

2. Number of Redeterminations

Redeterminations involve extensive review of technical data and may, as discussed below in subpart V.F.6, involve expert determination, litigation, or arbitration where the parties do not agree upon the adjustments. As a result, redeterminations tend to be relatively expensive.[215] Also, redeterminations merely reallocate existing value rather than create new value. Consequently, most unitizing parties will agree that there

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214. *See* 1 KRAMER & MARTIN, *supra* note 27, § 17.02[5][b], at 17-23 to 17-26.1.

215. One of the Authors was told that the Prudhoe Bay redetermination, a particularly messy proceeding that is discussed in subpart V.F.5, *infra*, cost between U.S. $50 million and U.S. $100 million when all expenses were considered.

should be a strict limit on the number of redeterminations permitted; at some point, the additional accuracy is not worth the additional cost. In practice, only one or two redeterminations are permitted.[216] In addition, unnecessary redeterminations may be limited by assessing a penalty for requesting a "frivolous" redetermination (that is, a redetermination that results in less than an agreed percentage shift in tract interests). The penalty might be payment of the other tract's costs, which can be substantial.[217]

3. Timing of Redeterminations

Because the purpose of a redetermination of tract interests is to improve the accuracy of the existing tract interests, it normally makes no sense to have a redetermination until substantial new data is obtained. For reservoirs that are unitized before they have been developed or produced, the first redetermination is typically not permitted until the reservoir has been developed and, perhaps, several years of production history have been obtained. Subsequent redeterminations may be permitted following some additional stated period of production history, or as a result of the acquisition of other new data, such as data from the drilling of step-out wells.[218]

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216. Of the Sample Unitization Agreements examined, three permitted only one redetermination, four allowed two redeterminations (but one of these allowed additional redeterminations before the scheduled final redetermination if there was a significant change in the number of wells or the reservoir engineering data), three allowed an unlimited number of redeterminations (but one of these only allowed one redetermination every five years, and one had only a short time period during which redeterminations were allowed), and one could not be analyzed as a result of insufficient information.

217. For example, one of the Sample Unitization Agreements examined provided as follows:

> If the second redetermination results in a change in Tract Participations of less than one (1) percentage point, Unit Operator's costs (excluding the costs incurred by Unit Operator in its capacity as a Unit Interest Owner) and all fees paid to experts in connection with the second redetermination shall be charged to the Unit Interest Owner(s) requesting the second redetermination; otherwise such costs and fees shall be charged to the Unit Account.

218. A step-out well is defined as "[a] well drilled as a 'step-out' from proven territory in an effort to ascertain the extent and boundaries of a producing formation."

Redeterminations are typically not permitted late in the life of a unitized reservoir because of the need to have sufficient remaining reserves to permit adjustments for past production[219] and because the smaller gains in accuracy obtained from additional data after the first several years of production may not justify the cost.[220]

4. Data Used for Redetermination

The parties to a redetermination generally desire that any data used by a third-party decisionmaker as part of the redetermination process be made available to all unit parties. The same disclosure requirement can be applied to the data used in proposals submitted by the unit operator, and each

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WILLIAMS ET AL., *supra* note 2, at 1092.

219. *See infra* subpart V.F.6.

220. The triggers for redetermination under the Sample Unitization Agreements examined showed no consistent pattern; they were as follows:

Sample 1: First redetermination upon earlier of final development well or commencement of commercial production; second redetermination after two years of production.

Sample 2: Redetermination to be conducted on or before third anniversary of government approval of the unitization.

Sample 3: First and second redeterminations to be conducted on specified dates. No field included unless it has at least one year's production history.

Sample 4: Redetermination requires "relevant new technical information." (Note that this agreement allowed an unlimited number of redeterminations.)

Sample 5: First redetermination on a specified date; second redetermination six months after the drilling of the last unit well.

Sample 6: Redetermination to be conducted upon achieving a specified cumulative production level and completing one new well.

Sample 7: Could not be analyzed as a result of insufficient information.

Sample 8: Redetermination process began upon execution of the agreement.

Sample 9: First determination after the drilling of six development wells; second redetermination upon request between two specified dates.

Sample 10: Redetermination to be conducted upon the earlier of five years from the issuance of the license or completion of ninety percent of the development drilling program.

Sample 11: Redetermination upon request, but no more than one every five years.

tract's owners, during negotiations.[221]

In addition to requiring disclosure of data, unit parties sometimes desire to restrict the data which are used for purposes of redetermination,[222] perhaps from a desire to control a third-party decisionmaker[223] or a desire to insure that the redetermination process is as consistent as possible with the original determination of tract interests. In those cases, a common database is prepared for purposes of a redetermination; some data may be automatically included (such as well logs from unit wells) and other data may require the approval of the parties before it can be included. While the use of a common database may limit some of the technical battles at the time of redetermination and may contribute to fairness, it does add another basis for challenging a redetermination reached by a third-party decisionmaker.[224]

5. Proposal and Approval of Redeterminations

The unit operator typically coordinates the redetermination process and submits a proposed redetermined set of tract interests together with supporting data. If the parties in a tract (or, in some cases, individual parties) that disagree with the unit operator's proposal, they may submit competing proposals. In general, any change to the tract interests must be acceptable to all parties, or to a substantial majority of parties including some from each block, in order to be voluntarily adopted. A unitization

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221. For example, one of the Sample Unitization Agreements examined stated:

> As part of this [proposed] procedure, the Unit Operator shall provide the Parties with copies of all pertinent maps and technical data used in the determination (as promptly as practicable). Any computer software used in the determination process shall be such as is agreed by the Parties and failing agreement, commercially available software shall be used.

222. The same Sample Unitization Agreement referenced *supra* note 221 stated: "All data from wells within the Unit Area and all relevant open data shall be utilized. Data from outside the Unit Area shall be utilized only by unanimous agreement of the parties."

223. *See infra* subpart V.F.5.

224. *See, e.g.*, Amoco (U.K.) Exploration Co. v. Amerada Hess Ltd., [1994] 1 Lloyd's Rep. 330, (Ch.) (discussing a dispute over which data could be presented to an expert); Shell U.K. Ltd. v. Enter. Oil Plc, [1999] 2 Lloyd's Rep. 456, (Ch.) (discussing a dispute over which computer program could be used by an expert).

agreement will generally specify a period of time for the parties to attempt to voluntarily agree upon such a redetermination.

If the parties fail to voluntarily agree upon a redetermination within the allowed time period, the redetermination is typically referred to binding third-party dispute resolution. The third party can be an expert, an arbitrator or arbitrators, or a court. An expert process is overwhelmingly preferred in international practice because an expert is likely to cost less and is more likely to have the technical skills and computing expertise appropriate for the decision.[225] However, decisions of both experts and arbitrators can be open to challenge on jurisdictional grounds, or as a result of a departure from the applicable rules for the process (whether set forth in the contract or incorporated by reference to a published set of rules). Other grounds for appeal may exist in various jurisdictions. For example, in the case of an arbitration under English law, the Arbitration Act 1996 allows either party to appeal questions of law to the courts (in contrast to typical treatment in the United States).

The petroleum industry has certainly had nightmarish redeterminations that have engendered a mass of litigation, probably none more so than the second redetermination for the Prudhoe Bay Unit in Alaska. The Prudhoe Bay Unit Operating Agreement provided for a redetermination of hydrocarbon pore volume (HPV) and "Sadlerochit Sandstone Main Area Oil Rim Acreage" for each tract on January 1, 1979, and on January 1, 1982. The Unit Operating Agreement further provided as follows:

> In the event the Working-Interest Owners do not agree by May 1, 1981, on the maps that describe the structure and thicknesses of rock units, those portions of such maps that are not agreed shall be submitted to binding arbitration in accordance with the provisions of Article 38. That arbitration shall be completed as soon as practicable. In the event the Working-Interest Owners do not agree on redetermined HPV values by

225. All but one of the Sample Unitization Agreements containing redetermination clauses referred redetermination disputes to an expert or experts. The one exception provided for future negotiation of the redetermination procedures.

> January 1, 1982, the redetermination thereof shall be submitted to binding arbitration in accordance with the provisions of Article 38, and that arbitration shall be completed as soon as practicable. The arbitrations shall be limited to those issues involving HPV values on which the Working-Interest Owners are not finally agreed at the time of the preliminary hearing, and the resolution of all issues by the Arbitration Board or Boards shall be within the outer bounds of the conflicting contentions of the Working-Interest Owners. The arbitration of the maps shall be submitted to a separate Arbitration Board.[226]

Unfortunately, the limited scope of jurisdiction of the arbitration board, coupled with language providing the following:

> The Board shall have no authority to decide any questions of law. However, the Board is authorized to interpret and administer the provisions of this Article 38 and to interpret any other provisions of this Agreement insofar as may be required for performance of the Board's duties pursuant to this Article 38. Nothing herein, however, shall bar any Working-Interest Owner from seeking a judicial interpretation or construction of such provisions.[227]

Additionally, the execution of various additional agreements relating to the redetermination process all contributed to extensive litigation in Delaware over the arbitration proceedings and award.[228] Further controversy (and litigation) arose as a

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226. Prudhoe Bay Unit Operating Agreement § 37.103 (Apr. 1, 1977).

227. *Id.* § 38.006. *Compare* Amoco Exploration Co. v. Amerada Hess Ltd.,1 Lloyd's Rep. 330, 332–35 (1994) (concerning a unitization agreement which forbid appeal to the courts prior to a final determination; accordingly, the court rejected an attempt by some parties to challenge an intermediate step in the expert proceedings).

228. *See* Phillips Petroleum Co. v. Arco Alaska, Inc., No. 7177, 1986 WL 7612 (Del. Ch. July 9, 1986); *see also* Phillips Petroleum Co. v. Arco Alaska, Inc., No. 7177, 1988 WL 60380 (Del. Ch. June 14, 1988); Phillips Petroleum Co. v. Arco Alaska, Inc., 1987 WL 20181 (Del. Ch. Nov. 19, 1987); Phillips Petroleum Co. v. Arco Alaska, Inc., No. 7177, 1987 WL 10650 (Del. Ch. May 8, 1987); Phillips Petroleum Co. v. Arco Alaska, Inc., 1986 WL 508 (Del. Ch. Dec. 16, 1986); Phillips Petroleum Co. v. Arco Alaska, Inc., No. 7177, 1985 WL 11560 (Del. Ch. May 15, 1985); Phillips Petroleum Co. v. Arco Alaska, Inc., No. 7177, 1983 WL 20283 (Del. Ch. Aug. 3, 1983).

result of a side agreement between two of the three tract owners fixing their relative participations and agreeing to allow one of the two to manage the arbitration on behalf of both of them.[229] The third tract asserted that the compromising tract should not have been permitted to participate in the arbitration and nominate separate arbitrators when the Unit Operating Agreement provided the following:

> If the subject matter, issue or controversy to be arbitrated involves or affects less than all the Working-Interest Owners in a Participating Area, this Article's reference to Working-Interest Owners shall be limited to those Working-Interest Owners that will be affected by the determination or resolution of the matter, issue, or controversy being arbitrated.[230]

Litigation over the Prudhoe Bay Unit redetermination continued for at least five years, at great cost to all unit parties. While such disastrous results cannot be completely prevented, they can be mitigated by various approaches in the relevant dispute resolution clause, including the following:

- giving broad authority to the decisionmaker to minimize jurisdictional challenges;
- insuring that the decisionmaker's redetermination will be final and binding, without right of appeal;
- adopting a "pendulum arbitration" approach in which the decisionmaker must choose one of the proposals submitted by the tracts (This requirement encourages the tracts to submit reasonable proposals for fear that the decisionmaker will choose the opposing proposal if it appears to be more reasonable.);
- avoiding excessively detailed standards for the process to be followed by the decisionmakers, thereby reducing the bases for challenges to the decisionmakers' actions; and
- establishing simple, fair standards for selecting qualified, impartial decisionmakers.[231]

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229. *See* Mobil Oil Corp. v. Exxon Corp., 177 Cal. App. 3d. 942 (Cal. Ct. App. 1986).

230. Prudhoe Bay Unit Operating Agreement § 38.004(c)(3).

231. Another approach that is sometimes suggested (though expensive) is a guided owner process in which an outside expert participates in the entire redetermination process and seeks to resolve each dispute as it arises. *See* 1 TERENCE DAINTITH ET AL.,

6. Effects of Redetermination: Production

Following the effective date of a redetermination, unit production will be shared between the tracts on the basis of the redetermined tract interests. In most cases, an adjustment is also made to bring the shares of past production received by each party in line with the redetermined unit interests.[232] This adjustment is typically accomplished by a temporary further increase (for purposes of allocation of production only) in the tract interest of the tract that has received a greater tract interest in the redetermination (the "Increased Tract"), and a corresponding temporary decrease (for purposes of allocation of production only) in the tract interest of the tract that received a reduced interest in the redetermination (the "Reduced Tract"), until the quantity of production attributable to the temporary increase in tract interest equals the additional quantity that the Increased Tract would have received prior to the effective date of the redetermination, had the redetermined tract interests always been in effect (the "Adjustment Quantity"). Typically, only a specified additional share of the Reduced Tract's tract interest is redistributed to the Increased Tract for this purpose so as not to cut off entirely the production and revenue stream of the Reduced Tract. A numerical example of the reallocation of production following a redetermination is included in Appendix II of this Article.

Note that the reallocation of production is handled in kind without adjustment for differences in price. This failure to account for differences in the price of past production and future make-up production means that the Increased Tract may actually receive more or less income from the Adjustment Quantity than it would have received, had the redetermined tract interests always been in effect. Notwithstanding this potential discrepancy, there has been no significant movement in the international petroleum industry to attempt to reallocate

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UNITED KINGDOM OIL AND GAS LAW 1184, § 1-742 (Adrian Hill ed., 3d ed., Sweet & Maxwell 2003) (1977).

232. Ten of the eleven Sample Unitization Agreements that had redetermination clauses provided for a retroactive adjustment of production. The remaining Sample Agreement contemplated redetermination prior to the commencement of production, so no adjustment was provided for.

income, rather than hydrocarbons, following redetermination.[233] While the reluctance to equalize income might be driven in part by the desire to receive reserves that can be booked for accounting and securities reporting purposes (by parties in the Increased Tract) and, in part, by a desire to limit the creation of taxable payments among the parties, the prevailing rationale seems to be an acceptance of price fluctuations as a normal risk taken by any producer.

One specific situation worth mentioning is the interaction of a redetermination with long-term production sales contracts.[234] If any unit party's production is committed under a long-term sales contract, one of four approaches generally must be taken: the contract may allow for changes in delivery quantities upon redetermination, the other tract may agree to take its additional tract interest subject to the delivery obligations under the sales contract, the adjustments pursuant to the redetermination may take place through volumes not subject to the sales contract, or the parties may settle the Adjustment Quantity in cash.[235]

Another specific situation worth mentioning is the effect of a redetermination on production debts owed by one unit party to the other. Such a production debt could consist of production owed by the national oil company to the other parties in reimbursement of past costs, where the national oil company acquires an interest upon development, or the production owed by one contractor company to another under a carry arrangement between them. If the redetermination results in a

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233. *But see* Derman & Derman, *supra* note 112.

234. The interaction between redeterminations and long-term sales contracts will be a particular concern in gas development projects with long-term offtakers and financing, such as LNG projects and power plants.

235. Yet another variant for resolving effects of redeterminations on long-term sales contracts is included in one of the Sample Unitization Agreements reviewed, which states:

> When agreeing on said procedures the Parties shall take due account of their relevant existing gas sales contracts. Said procedures shall, thus, inter alia, contain provisions which obligates [sic] the Deficient Parties to offer volumes of Natural Gas to the Excess Parties enabling the Excess Parties to fulfil their gas sales obligations. The price to be agreed for such volumes of Natural Gas shall not exceed the price the Excess Parties have agreed with their buyers for the same volumes.

change in the past costs attributable to the carried interest,[236] then it should also result in a corresponding reduction in the production owed to reimburse those costs. Alternatively, the carry arrangement could be treated as a separate loan between the parties that is not affected by the redetermination, with no change in the amount of production owed. This later approach seems harsh if, pursuant to the redetermination, the party or parties entitled to the production receive a refund of some portion of the costs that are being reimbursed.

7. Effects of Redetermination: Costs

As was the case with production, following the effective date of a redetermination, unit costs will be shared between the tracts on the basis of the redetermined tract interests. In most cases, an adjustment is also made to bring the shares of past costs borne by each party in line with the redetermined unit interests. Unlike the adjustment for past production, which is typically made over time, the adjustment for the difference between past costs actually borne by the parties in each tract and the past costs that they would have borne, had the redetermined tract interests always been in effect, is sometimes made by lump-sum cash payments between the parties at the effective date of redetermination. This can result in "winner's remorse," where the Increased Tract parties must make significant payments to the Reduced Tract parties on the effective date even though Increased Tract parties only receive the benefits of their increased share of production over time. A better way to handle such payments would be to allow the parties in the Reduced Tract to recover the past costs to which they are entitled from the proceeds of the increased share of production to which the Increased Tract is entitled. In this way, the parties in the Increased Tract never need to make a net cash payment as a result of their good fortune.[237] Under either

236. *See infra* subpart V.F.7.

237. Of the Sample Unitization Agreements that provided for retroactive adjustments of costs, five required immediate payment by the Increased Tract; two allowed payment over the same twelve-month period as make-up production was received; one required payment over a six-month period; one required a lump-sum payment after twelve months; and two could not be analyzed as a result of insufficient

approach, the reimbursed amounts may bear interest from the original date of each expenditure. A numerical example of the reallocation of costs following a redetermination is included in Appendix II of this Article.

A unit that is part of a financed project will need to address a unique issue upon redetermination. In a typical project financing, certain costs are paid out of the proceeds of production before distribution of remaining proceeds to the project's owners. These costs generally include, at a minimum, operating costs, taxes, and financing costs ("Deducted Costs"). As a result of the payment of Deducted Costs out of the proceeds of production, Deducted Costs are borne by the parties in proportion to each party's interest in production. Consequently, when the Adjustment Quantity is shifted from the Reduced Tract to the Increased Tract, and the Increased Tract's tract interest for production purposes becomes greater than its tract interest for cost purposes, the Increased Tract bears an excessive share of Deducted Costs. This excessive share can be corrected by either (i) increasing the Adjustment Quantity by an appropriate amount so that the net amount received by the Increased Tract after deduction of Deducted Costs is at the correct level, or (ii) requiring cash payments from the Reduced Tract to the Increased Tract to offset the excess share of Deducted Costs borne by the Increased Tract.

8. Effects on Host-Government Contracts

As is the case with the original unitization, a redetermination of tract interests will likely require host-government approval, unless the original approval included the redetermination clause.[238] It is unlikely that the host government will agree to retroactive adjustments of royalties, taxes, cost recovery, and production sharing based on retroactive

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information.

238. The parties to one Sample Unitization Agreement indicated that the host government did not require approval of the redetermination results because it had already approved the redetermination mechanism along with the original unitization agreement. Two of the Indonesian unitization agreements examined, in contrast, expressly provided that implementation of redetermined tract interests might, or would, require the approval of Pertamina, the national oil company.

adjustments of production costs between the parties. Instead, the host government will collect royalties and taxes and calculate cost recovery and production sharing for each tract based on reallocated production quantities, including any Adjustment Quantity, as the production is sold, and will treat the payment of past costs from the Increased Tract to the Reduced Tract as taxable income for the Reduced Tract and a deduction for the Increased Tract.[239]

9. Trend Toward No Redetermination

Because of the complexity and cost of redetermination, as described above, more unit agreements are being negotiated without redetermination clauses.[240] Such a decision may be reasonable where good seismic and well-control data are available at the time the unitization agreement is negotiated or where the field is of marginal commerciality that does not justify the cost of any redetermination. Proceeding without such a clause presents substantial risks for each tract in a situation where little data is available at the time the unitization agreement is negotiated.

G. Unit Decisionmaking

In contrast to an operating agreement for a single tract, a unitization agreement involves two or more groups of parties. As a consequence, two completely different decisionmaking structures are possible: (i) individual voting by each unit party or (ii) decisionmaking by each tract under its tract operating agreement, with each tract voting as a block in the unit. In practice, the former alternative is the overwhelming choice for unitization agreements as it preserves individual party involvement in unit operations and makes majority

239. This treatment was confirmed by the parties to one of the Sample Unitization Agreements that had undergone a redetermination.

240. *See, e.g.*, 1 DAINTITH, *supra* note 231, § 1-744.

decisionmaking across blocks possible.[241] Generally, the only time that tracts may be asked to vote as a whole is on redetermination decisions, where, except as a result of cross-boundary affiliations, the interests of the parties in each tract are aligned. (Typically, though, even these redetermination decisions are made by the unanimous vote of all parties, rather than by tract.) A tract with a minority-tract interest may also insist that certain major decisions require a supermajority vote or require a vote from at least one party in each tract that does not have an affiliation with a party from another tract, thus assuring the parties in the minority-tract have some voice in decisions.

H. Nonunit Operations

As noted above, when a unitization does not incorporate all areas of each tract, all depths, or all substances, each tract will continue to be entitled to conduct nonunit operations under its tract operating agreement with respect to the areas, depths, or substances that are not unitized. The potential interaction of such nonunit operations with unit operations should be addressed in the unitization agreement.

1. Priorities

The prevailing rule in unitization practice is that unit operations have priority over nonunit operations. Parties in a tract wishing to conduct nonunit operations within the unit area are generally required to provide advance notice to all unit parties, and may be required to obtain the prior approval of the unit operating committee. If prior approval is not required, the unit operating committee may nonetheless be authorized on its own motion to vote to block nonunit operations that it determines will jeopardize unit operations.

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241. Eight of eleven Sample Unitization Agreements examined provided for voting by individual unit parties; in a ninth Sample Agreement, the second tract was held by the national oil company, so the tract operator acted on behalf of all parties to the first tract; and in two of the eleven Sample Agreements, insufficient information limited the Authors' analysis.

2. Drilling Through Unit Reservoirs

For the reasons described in subpart V.H.1, protection of the unit reservoir is an express priority in unitization agreements. Any nonunit well that may penetrate the unit reservoir to seek deeper targets or nonunit substances is typically subject to the prior approval of the unit operating committee. The proponents of the well must furnish the well prognosis, including its casing program and method for protecting the unit reservoir, to all unit parties. The unit may be given an option to take over those nonunit wells that the participating parties desire to abandon, and parties in the individual tracts may be given an option to take over unit wells that the unit desires to abandon.

3. Joint Use of Infrastructure

In line with one of the main purposes of unitization—to avoid economic waste—unitization agreements often permit unit operations and nonunit operations to share infrastructure on the terms set forth in the unitization agreement. Generally, this sharing relates only to excess capacity; the infrastructure owners typically have absolute priority, subject to any agreement reached to the contrary. The charge for nonunit operations to use unit infrastructure, or vice-versa, is generally based upon reimbursement of operating costs, and perhaps a capital recovery charge. All of the usual concerns involved in joint use of infrastructure must be addressed, including tie-in, installation and removal of additional equipment, quality standards for production delivered into the infrastructure, and quality bank adjustments for different values of production furnished by each group.

4. Relationships with Unit Redeterminations and Expansions

One reason that the parties in a tract may wish to conduct nonunit operations is to prove additional reserves of unitized substances that can then be credited to that tract upon a redetermination or expansion. This can make a proposed right to conduct nonunit operations a contentious issue. Particular points to be addressed will include the following:

- Can nonunit exploration or appraisal wells targeting the unitized formations be drilled within the unit area, but outside of known reservoir boundaries?
- Does one tract have a right to require that the unit area be expanded to incorporate reserves in the unitized reservoir that it discovers outside of the unit area?
- Is the unit required to purchase successful nonunit wells that result in new discoveries within the unit reservoir?

On a related note, a tract with a minority interest will also have concerns regarding the use of unit operations and unit funds to prove additional reserves for the benefit of the majority tract.

VI. CONCLUSIONS

A unitization agreement can be difficult to negotiate and implement because of the complex issues involved, the layering of several sets of agreements of overlapping subject matter, the prospect of revisions to the economic and voting interests of the parties during the life of the agreement, and the general absence of regulatory guidelines. Notwithstanding such difficulties, unitization is best served by a carefully written agreement that addresses the relevant issues clearly, because the costs of resolving disputes over a flawed agreement far exceed the costs of achieving a carefully written agreement.[242]

The "best practices" listed for country laws, regulations, and model contracts in subpart II.N above can be joined by one overarching best practice for all participants in the unitization process. The "best practice" of all appears in the conclusion of David Eckman's survey of all thirty-one unitization provisions of the states of the United States: "Fieldwide unitization, even with statutory assistance and for all its logic, belongs to that . . . special class of legal endeavors for which success can result only when all participants practice good faith, know their subjects and govern their actions with wisdom."[243]

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242. *See*, *e.g.*, *supra* note 215.

243. Eckman, *supra* note 48, at 381.

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1. Red Eagle Production Sharing Agreement Of 1992 Between The Ministry Of Oil And Mineral Resources And Red Eagle Resources Corp. (Ramah Block) (Barrows Supplement No. 125, M. East) 193

A. ANGOLA

1. Model Production Sharing Agreement 1997, Production Sharing Agreement between Sociedade Nacional de Combustiveis de Angola -Unidade Economica Estatal (Sonangol, U.E.E.) and _____ in the Area of Block ___ (PEPS)

Article 1 (Definitions)

45. "Petroleum" means Crude Oil of various densities, asphalt, Natural Gas and all other hydrocarbon substances that may be found in and extracted, or otherwise obtained and saved from the Contract area.

Article 27 (Unitization)

1. In the event of there being Petroleum deposits, capable of a commercially viable Development which extends beyond the Contract Area, and where other entities have agreements for the Exploration and Production of Petroleum with a similar Unitization provision, Sonangol may, by means of written notice addressed to Contractor Group and said other entities, require that the Petroleum in those deposits should be developed and produced in mutual cooperation.

2. Sonangol, by means of written notice addressed to Contractor Group and the other entities as aforesaid, may also require that a similar procedure to that mentioned in the preceding paragraph be adopted, in relation to other existent Petroleum deposits within the Contract Area, if these are commercially viable only when developed together with Petroleum deposits in areas adjacent to the Contract Area.

3. Should Sonangol make use of the rights referred to in the preceding paragraphs, Contractor Group shall use all reasonable endeavors to cooperate with the other entities in the preparation of a plan for the joint development and production of the deposits in question.

   Such plan shall be presented to Sonangol within a period of one hundred and eighty (180) days from the date when Contractor Group and the other entities as aforesaid received the relevant notice, or such longer period as Sonangol may agree.

4. Should the plan not be presented within the period established in the preceding paragraph Sonangol may arrange for an independent consultant acceptable to all parties concerned to prepare a plan, at the expense of the Contractor Group and the other entities, for the joint Development and Production of the deposits in accordance with generally accepted practice in the international petroleum industry.

   The consultant must consult with and keep all members of the Contractor Group and the other entities informed on a regular basis.

5. The plan prepared under the terms of the preceding paragraphs shall be in accordance with the rules established in this Agreement, in particular as regards the rights and obligations of Contractor Group, and it shall establish an adequate rate of return for Contractor Group compatible with the proportional share which the latter assumes in the joint Development and Production.

6. Once the plan referred to in the preceding paragraphs has been prepared, the Parties and the other entities shall meet within sixty (60) days from the date of submittal of said plan to agree on its implementation, which shall be initiated no later than ninety (90) days

from the date of the agreement or such other later date as Sonangol may agree.

7. If Contractor Group does not accept the plan prepared under paragraph 4 above or if Contractor Group refuses the implementation of the plan or if Contractor Group does not initiate said implementation within the time period established under paragraph 6, or further more if after an agreement has been reached for the preparation of a plan under paragraph 3, the implementation of same is not started within the period of paragraph 6, Contractor Group shall relinquish to Sonangol those parts of the Contract Area together with the Petroleum deposits lying thereunder which were the subject of Sonangol's notice referred to in paragraphs 1 and 2 above, without prejudice to Contractor Group's other rights and obligations under this Agreement in respect of the remainder of the Contract Area.

8. Any joint Development and Production in accordance with this Article 27 is without prejudice to the provisions of Article 29 and Article 31, paragraphs 2(e) and 11 ((b).

9. In the event that a unitization process under this Article affects the whole or part of an obligation which Contractor Group must fulfill within a certain time period under the Agreement, such time period shall be extended by the time elapsed between Sonangol's written notice under paragraphs 1 and 2 above and the date of mutual agreement on the plan of the related joint Development.

In any event this extension shall not be more than twelve (12) Months, or such longer period as agreed by Sonangol.

B. AZERBAIJAN

1. *The Oil and Gas Law of the Azerbaijan Republic, Parliament Commission Draft, April 13, 2000 (Barrows Supp. No. 43, Russia & NIS)*

Article 13. Unitization

The Exploration, Development and Production Contract shall provide that in cases where a portion of a single Oil and Gas field is located in one Contract Area and the remainder of the field is located in the Contract Area of one or more other Exploration, Development and Production Contracts, the respective Contractors may enter into an agreement with the Proper Executive Authority for joint development and production of the Oil and Gas resources of the unitized field.

2. *Agreement Dated 19 April 1999 On The Exploration, Development And Production Sharing For The Block Including The Padar Area And the Adjacent Prospective Structures In the Azerbaijan Republic Between the State Oil Company Of Azerbaijan And Kura Valley Development Company Ltd. And Socar Oil Affiliate (Barrows Supp. No. 44, Russia & NIS)*

5.4 Discovery

Before the end of the Exploration Period or if Contractor enters the Additional Exploration Period, then before the end of the Additional Exploration Period, Contractor shall notify SOCAR in writing of a discovery and its commerciality, summarizing relevant information relating to said Discovery, including but not limited to the following, to the extent same are available: location plan, geological maps and interpretations, seismic and other geophysical data, drilling reports, well logs, core samplings, lithologic maps and description of formations, drill stem tests, completion reports, production tests including quantities of fluids produced, build-up/draw-down tests and

pressure analyses, and analyses of oil, gas and water samples and other information consistent with generally accepted international petroleum industry practice ("Notice of Discovery and its Commerciality).

In the event Contractor does not submit a Notice of Discovery and its Commerciality during the Exploration Period, or if Contractor proceeds to the Additional Exploration Period, during the Additional Exploration Period, then SOCAR has the right to terminate this Agreement by giving thirty (30) days prior notice to Contractor after the expiry of the Exploration Period or the Additional Exploration Period accordingly and any costs incurred by Contractor, including but not limited to Bonus payments, shall not be recoverable.

In the event the appraisal of existing pool/pools and/or a Discovery indicates that the natural boundary of the existing pool/pools and/or a Discovery extends to areas outside the Contract Area SOCAR shall be entitled (but not obligated) to grant the additional areas to Contractor and if granted such additional areas shall become subject to this Agreement.

Article 16. Natural Gas

16.2 Non-associated Natural Gas

In the event of a Non-associated Natural Gas Discovery additional terms for commercial development of such Non-associated Natural Gas shall be agreed between SOCAR and Contractor, Return on Contractor's investment in the Non-associated Natural Gas Discovery and development shall be through marketing of Non-associated Natural Gas in accordance with the mechanism described in Articles 12.2 and 12.4. In the case of a Non-associated Natural Gas Discovery, profit Petroleum shall be shared through marketing of Non-associated Natural Gas in accordance with the mechanism described in Article 12.4. Contractor together with SOCAR shall use full and reasonable endeavors, to rapidly conclude terms acceptable to the Parties to develop the Discovery, and with Third Parties to

enter into the necessary long term Non-associated Natural Gas export sales and pipeline contracts. Contractor shall pursue markets for Non-associated Natural Gas both within and outside the Azerbaijan Republic.

If the Non-associated Natural Gas Discovery is not a gas cap of a Crude Oil Discovery, and the Parties have failed to agree on additional terms on commercial development before the completion of the Exploration Period, or Additional Exploration Period, then within twenty four (24) months of the date of approval by SOCAR of the Development Program, SOCAR and/or its Affiliates shall have the right exercisable at any time before Contractor has commenced development of the Non-associated Natural Gas Discovery pursuant to the Development Program by giving written notice to Contractor and/or SOCAR to develop at its sole risk and cost and subject to this Article 16 such Non-associated Natural Gas Discovery in accordance with the provisions of the Development Program related to such Non-associated Natural Gas Discovery subject to reimbursement in full by SOCAR to Contractor of costs incurred by Contractor in accordance with the mechanism described to Articles 12.2 and 12.4.

SOCAR and/or its Affiliates shall conduct Petroleum Operations in a diligent, safe and efficient manner and in accordance with generally accepted principles of the international Petroleum industry and otherwise in accordance with the terms of this Agreement. SOCAR and/or its Affiliates and Contractor shall conduct Petroleum Operations in the Contract Area in a manner that does not interfere or hinder the conduct of Petroleum Operations of each other and also in a manner which shall not directly or indirectly damage the overall reservoir performance.

3. Amoco Group Agreement Dated 14 December 1996 - On the Exploration, Development & Production Sharing For the Prospective Structures Ashrafi, Dan Ulduzu & Area Adjacent in the Azerbaijan Sector of the Caspian Sea (Barrows Supp. No. 24, Russia & NIS)

Art. 4.4 on Discovery

In the event Contractor does not submit a Notice of Discovery and its Commerciality during the Exploration Period or the Additional Exploration Period, whichever period is applicable, this Agreement shall terminate and any costs incurred by Contractor, including but not limited to Bonus payments and acreage fee, shall not be cost recoverable. In the event the appraisal of existing pool/pools and a Discovery indicates that the natural boundary of the existing pool/pools and a Discovery extends to areas outside the Contract Area SOCAR shall be entitled (but not obligated) to grant the additional areas to Contractor. Any such additional areas, if granted, shall be subject to this Agreement.

Notwithstanding any provisions of this Agreement to the contrary, SOCAR shall retain the right to unitize the Contract Area with adjacent block or blocks on unitization terms as mutually agreed between the Parties.

C. BRAZIL

1. Petroleum Law No. 9778, 6 August 1997, The Regulation of the Petroleum Industry in Brazil (PEPS)

TEXT OF LAW No. 2.142 OF 1996, AS APPROVED BY THE HOUSE OF REPRESENTATIVES IN MARCH 19, 1997, THE SENATE IN JULY 16, 1997, AND RATIFIED BY THE PRESIDENT OF BRAZIL ON AUGUST 6, 1997

Disposes on the national energy policy, on the activities related to the petroleum monopoly, creates the National Council of Energy Policy and the National Petroleum Agency, and gives other provisions. The NATIONAL CONGRESS decrees:

Art. 21

All rights to oil and natural gas exploration and production and on the national territory, therein included the onshore part, the territorial sea, the continental shelf, and the exclusive economic zone, are federal property, and shall be administered by ANP.

Art. 27

In case of fields extending over adjoining blocks, operated by other concessionaires, the parties involved shall agree on the splitting of the production.

[] In case of non-agreement within the maximum period fixed by the ANP, the latter shall, based on an arbitral award, determine how the rights to the blocks and the obligations shall be equitably appropriated, based on applicable general legal principles.

2. 2003 Model Concession Agreement (5th ANP Round), Federal Republic Of Brazil, Ministry Of Mines And Energy, Concession Agreement For The Exploration, Development And Production Of Oil And Natural Gas By And Between Agência Nacional Do Petróleo And _____Brazil 2003 (PEPS)

Clause 12 - Unitized Production

Agreement for Unitization of Production

12.1 In the case of a Discovery under this Agreement, in which the relevant Pool may extend outside the Concession Area, the Concessionaire will officially inform this fact to the ANP within 72 hours from the time the Concessionaire becomes aware of such extension.

12.1.1 If another Concessionaire has rights to the adjacent area to which the relevant Pool extends, the ANP will notify such Concessionaire with the purpose of having all interested parties get together and execute an agreement which results in common Development and the unitization of Production.

12.1.2 If there is no Concessionaire with rights to such adjacent area, but the ANP in its sole discretion believes that a sufficient Evaluation of the Pool or Pools concerned has been done in order to permit the ANP to form a reasonable judgment regarding unitization, the ANP itself may act as if it were the Concessionaire of such area for purposes of negotiating and executing the agreement for unitization of Production contemplated in paragraph 12.1. However, at any time prior, during or after such negotiation and execution of the agreement, the ANP may offer for bidding the referred Block or Blocks, in which case, once the relevant Concessionaire(s) is selected, these will assume their responsibilities pursuant to this Clause Twelve and be obligated to fulfill the unitization agreement signed by the ANP.

Rights and Obligations of Interested Concessionaires

12.2 The agreement referred to in paragraphs 12.1.1 or 12.1.2 will equitably contemplate the rights and obligations of the interested Concessionaires, defining the unitized area, its Operator, the participation of each one in the Exploration, Evaluation, Development and Production of the Pool, the relevant Development Plan, the payment of Government and third-parties participation, respecting, for each involved Concessionaire, the amounts specified in the relevant Concession Agreement, and, in general, all other aspects usually covered in this kind of agreement according to Oil Industry Best Practice and the terms of the applicable Brazilian legislation and the Concession Agreements related to the Blocks in which the unitized area is located.

12.2.1 Before the approval of an agreement for the unitization of Production, the ANP may, in its sole discretion, allow an Operator from one of the adjacent areas to undertake Evaluation activities in the area to be unitized where this is unanimously agreed by all involved parties.

12.2.2 If so requested, the ANP may act as mediator in the negotiations of the agreements for unitization of Production, seeking to reconcile the interests of the interested Concessionaires in order for them to reach a consensus, including the determination of deadlines for the execution of the unitization of Production agreements.

Modifications to Agreement by ANP

12.3 When the Concessionaires enter into the agreement for unitization of Production, the ANP shall have 60 (sixty) days from the receipt of the agreement duly signed by all involved Concessionaires, to request any amendments the ANP deems advisable. In the event the ANP requests amendments, the Concessionaire and the other interested parties shall have 60 (sixty) days from the date the request was made to discuss them with the ANP and submit to the ANP appropriate modifications

to the previously submitted agreement for unitization, repeating in its entirety the procedures outlined in this paragraph 12.3. Once the agreement for unitization of Production becomes final and definitive, the interested Concessionaires will be obligated to fully comply with it and any amendments to it are subject to the prior written approval of the ANP, such amendments being subject to the procedure contemplated in this paragraph 12.3.

Suspension of Operations

12.4 Should the agreement for the unitization of Production contemplated herein not be approved by the ANP, pursuant to this Clause Twelve, the Development and Production of the relevant Pool will be suspended, unless otherwise approved by the ANP, at its sole discretion, until the unanimous and express agreement is obtained from all parties involved for this purpose.

Rescission

12.5 In accordance with article 27 of the Petroleum Law, if one of the parties involved refuses to execute, within the deadline fixed by the ANP, the unitization agreement determined by the ANP and supported by an arbitration report, the provisions of paragraph 30.1 shall be applied, and the Contract of the party which refuses to execute the unitization agreement shall be rescinded. After the rescission the ANP may act as the Concessionaire of such an area, in accordance with the provisions of paragraph 12.1.2.

3. 2002 Model Concession Agreement (4th ANP Round), Federal Republic Of Brazil, Ministry Of Mines And Energy, Concession Agreement For The Exploration, Development And Production Of Oil And Natural Gas By And Between Agéncia Nacional Do Petróleo And _____ Brazil 2002 (PEPS)

Clause 1 – Definitions

1.2.14 "Discovery" means any occurrence of Oil and Natural Gas, other hydrocarbons, minerals, and, in general, any other natural resources in the Concession Area, independent from quantity, quality or commercial viability, verified by at least two detection or evaluation methods.

Clause 12 - Unitized Production

Agreement for Unitization of Production

12.1 In the case of a Discovery under this Agreement, in which the relevant Pool may extend outside the Concession Area, the Concessionaire will officially inform this fact to the ANP at the time the Concessionaire becomes aware of such extension.

12.1.1 If another Concessionaire has rights to the adjacent area to which the relevant Pool extends, the ANP will notify such Concessionaire with the purpose of having all interested parties get together and execute an agreement which results in common Development and the unitization of Production.

12.1.2 If there is no Concessionaire with rights to such adjacent area, but the ANP in its sole discretion believes that a sufficient Evaluation of the Pool or Pools concerned has been done in order to permit the ANP to form a reasonable judgment regarding unitization, the ANP itself may act as if it were the Concessionaire of such area for purposes of negotiating and

executing the agreement for unitization of Production contemplated in paragraph 12.1. However, at any time prior, during or after such negotiation and execution of the agreement, the ANP may offer for bidding the referred Block or Blocks, in which case, once the relevant Concessionaire(s) is selected, these will assume their responsibilities pursuant to this Clause Twelve and be obligated to fulfill the unitization agreement signed by the ANP.

Rights and Obligations of Interested Concessionaires

12.2 The agreement referred to in paragraphs 12.1.1 or 12.1.2 will equitably contemplate the rights and obligations of the interested Concessionaires, defining the unitized area, its Operator, the participation of each one in the Exploration, Evaluation, Development and Production of the Pool, the relevant Development Plan, the payment of Government and third-parties participations, respecting, for each involved Concessionaire, the amounts specified in the relevant Concession Agreement, and, in general, all other aspects usually covered in this kind of agreement according to Oil Industry Best Practice and the terms of the applicable Brazilian legislation and the Concession Agreements related to the Blocks in which the unitized area is located.

12.2.1 Before the approval of an agreement for the unitization of Production, the ANP may, in its sole discretion, allow an Operator from one of the adjacent areas to undertake Evaluation activities in the area to be unitized where this is unanimously agreed by all involved parties.

12.2.2 If so requested, the ANP may act as mediator in the negotiations of the agreements for unitization of Production, seeking to reconcile the interests of the interested Concessionaires in order for them to reach a consensus.

12.2.3 If there is no Concessionaire for adjacent areas and/or the Evaluation of the Pool is insufficient to permit meaningful discussions regarding unitization, the Concessionaire may

nonetheless proceed with the Declaration of Commerciality, as provided in this Agreement. If the Concessionaire believes that Development of those parts of the Pool lying inside the Concession Area can be done in accordance with applicable Brazilian laws and Oil Industry Best Practice, it may submit a Development Plan, conforming to the provision of Clause Nine.

Modifications to Agreement by ANP

12.3 If the Concessionaire enters into an agreement for unitization of Production, the ANP shall have 60 (sixty) days from the receipt of the agreement duly signed by all involved Concessionaires, to request any amendments the ANP deems advisable. In the event the ANP does not respond within such period, the referred agreement will be considered final and definitive. In the event the ANP requests amendments, the Concessionaire and the other interested parties shall have 60 (sixty) days from the date the request was made to discuss them with the ANP and submit to the ANP appropriate modifications to the previously submitted agreement for unitization, repeating in its entirety the procedures outlined in this paragraph 12.3. Once the agreement for unitization of Production becomes final and definitive, the interested Concessionaires will be obligated to fully comply with it and any amendments to it are subject to the prior written approval of the ANP, such amendments being subject to the procedure contemplated in this paragraph 12.3.

Suspension of Operations

12.4 Should the agreement for the unitization of Production contemplated herein not be approved by the ANP, pursuant to this Clause Twelve, the Development and Production of the relevant Pool will be suspended, unless otherwise approved by the ANP, at its sole discretion, until the unanimous and express agreement is obtained from all parties involved for this purpose.

4. 2001 Model Concession Agreement (3rd ANP Round), Federal Republic Of Brazil, Ministry Of Mines And Energy, Concession Agreement For The Exploration, Development And Production Of Oil And Natural Gas By And Between Agência Nacional Do Petróleo And _____ Brazil 2001 (Barrows)

Clause 12 - Unitized Production

Agreement for Unitization of Production

12.1 In the case of a Discovery under this Agreement, in which the relevant Pool may extend outside the Concession Area, the Concessionaire will officially inform this fact to the ANP at the time the Concessionaire becomes aware of such extension.

12.1.1 If another Concessionaire has rights to the adjacent area to which the relevant Pool extends, the ANP will notify such Concessionaire with the purpose of having all interested parties get together and execute an agreement which results in common development and the unitization of Production.

12.1.2 If there is no Concessionaire with rights to such adjacent area, but the ANP in its sole discretion believes that a sufficient Evaluation of the Pool or Pools concerned has been done in order to permit the ANP to form a reasonable judgment regarding unitization, the ANP itself may act as if it were the Concessionaire of such area for purposes of negotiating and executing the agreement for unitization of Production contemplated in paragraph 12.1. However, at any time prior, during or after such negotiation and execution of the agreement, the ANP may offer for bidding the referred Block or Blocks, in which case, once the relevant Concessionaire(s) is selected, these will assume their responsibilities pursuant to this Clause Twelve and be obligated to fulfill the unitization agreement signed by the ANP.

Rights and Obligations of Interested Concessionaires

12.2 The agreement referred to in paragraphs 12.1.1 or 12.1.2 will equitably contemplate the rights and obligations of the interested Concessionaires, defining the unitized area, its Operator, the participation of each one in the Exploration, Evaluation, Development and Production of the Pool, the relevant Development Plan and the time period for its presentation to the ANP, the payment of Government and third-parties participations, respecting, for each involved Concessionaire, the amounts specified in the relevant Concession Agreement, and, in general, all other aspects usually covered in this kind of agreement according to Oil Industry Best Practice and the terms of the applicable Brazilian legislation and the Concession Agreements related to the Blocks in which the unitized area is located.

12.2.1 Before the approval of an agreement for the unitization of Production, the ANP may, in its sole discretion, allow an Operator from one of the adjacent areas to undertake Evaluation activities in the area to be unitized where this is unanimously agreed by all involved parties.

12.2.2 If so requested, the ANP may act as mediator in the negotiations of the agreements for unitization of Production, seeking to reconcile the interests of the interested Concessionaires in order for them to reach a consensus.

12.2.3 If there is no Concessionaire for adjacent areas and/or the Evaluation of the Pool is insufficient to permit meaningful discussions regarding unitization, the Concessionaire may nonetheless proceed with the Declaration of Commerciality, as provided in this Agreement. If the Concessionaire believes that Development of those parts of the Pool lying inside the Concession Area can be done in accordance with applicable Brazilian laws and Oil Industry Best Practice, it may submit a Development Plan, conforming to the provision of Clause Nine.

Modifications to Agreement by ANP

12.3 If the Concessionaire enters into an agreement for unitization of Production, the ANP shall have 60 (sixty) days from the receipt of the agreement duly signed by all involved Concessionaires, to request any amendments the ANP deems advisable. In the event the ANP does not respond within such period, the referred agreement will be considered final and definitive. In the event the ANP requests amendments, the Concessionaire and the other interested parties shall have 60 (sixty) days from the date the request was made to discuss them with the ANP and submit to the ANP appropriate modifications to the previously submitted agreement for unitization, repeating in its entirety the procedures outlined in this paragraph 12.3. Once the agreement for unitization of Production becomes final and definitive, the interested Concessionaires will be obligated to fully comply with it and any amendments to it are subject to the prior written approval of the ANP, such amendments being subject to the procedure contemplated in this paragraph 12.3.

Suspension of Operations

12.4 Should the agreement for the unitization of Production contemplated herein not be approved by the ANP, pursuant to this Clause 12, the Development and Production of the relevant Pool will be suspended, unless otherwise approved by the ANP, at its sole discretion, until the unanimous and express agreement is obtained from all parties involved for this purpose.

5. 2000 Model Concession Agreement (2nd ANP Round), Federal Republic Of Brazil, Ministry Of Mines And Energy, Concession Agreement For The Exploration, Development And Production Of Oil And Natural Gas By And Between Agência Nacional Do Petróleo And _____ Brazil 2000 (Barrows)

Clause 12 - Unitized Production

Agreement for Unitization of Production

12.1 In the case of a Discovery under this Agreement, in which the relevant Pool may extend outside the Concession Area, the Concessionaire will officially inform this fact to the ANP at the time the Concessionaire becomes aware of such extension.

12.1.1 If another Concessionaire has rights to the adjacent area to which the relevant Pool extends, the ANP, will notify such Concessionaire with the purpose of having all interested parties get together and execute an agreement which results in common development and the unitization of Production.

12.1.2 If there is no Concessionaire with rights to such adjacent area, but the ANP in its sole discretion believes that a sufficient Evaluation of the Pool or Pools concerned has been done in order to permit the ANP to form a reasonable judgment regarding unitization, the ANP itself may act as if it were the Concessionaire of such area for purposes of negotiating and executing the agreement for unitization of Production contemplated in paragraph 12.1. However, at any time prior, during or after such negotiation and execution of the agreement, the ANP may offer for bidding the referred Block or Blocks, in which case, once the relevant Concessionaire(s) is selected, these will assume their responsibilities pursuant to this Clause Twelve and be obligated to fulfill the unitization agreement signed by the ANP.

Rights and Obligations of Interested Concessionaires

12.2 The agreement referred to in paragraphs 12.1.1 or 12.1.2 will equitably contemplate the rights and obligations of the interested Concessionaires, defining the unitized area, its Operator, the participation of each one in the Exploration, Evaluation, Development and Production of the Pool, the relevant Development Plan and the time period for its presentation to the ANP, the payment of Government and Third-Parties participations, respecting, for each involved Concessionaire, the amounts specified in the relevant Concession Agreement, and, in general, all other aspects usually covered in this kind of agreement according to Oil Industry Best Practice and to the terms of the relevant Brazilian legislation and Concession Agreements related to the Blocks in which the unitized area is located.

12.1.1 If so requested, the ANP may act as mediator in the negotiations of the agreements for unitization of Production, seeking to reconcile the interests of the interested Concessionaires in order for them to reach a consensus.

12.1.2 If there is no Concessionaire for adjacent areas and/or the Evaluation of the Pool is insufficient to permit meaningful discussions regarding unitization, the Concessionaire may nonetheless proceed with the Declaration of Commerciality, as provided in this Agreement. If the Concessionaire believes that Development of those parts of the Pool lying inside the Concession Area can be done in accordance with applicable Brazilian laws and Oil Industry Best Practice, it may submit a Development Plan, conforming to that which is defined in Clause Nine.

Modifications to Agreement by ANP

12.3 If the Concessionaire enters into an agreement for unitization of Production, the ANP shall have 60 (sixty) days from the receipt of the agreement duly signed by all involved Concessionaires, to request any amendments the ANP deems

advisable. In the event the ANP does not report within such period, the referred agreement will be considered final and definitive. In the event the ANP requests amendments, the Concessionaire and the other interested parties shall have 60 (sixty) days from the date the request was made to discuss them with the ANP. Once the agreement for unitization of Production becomes final and definitive, the interested Concessionaires will be obligated to fully comply with it and any amendments to it are subject to the prior written approval of the ANP, such amendments being subject to the procedure contemplated in this paragraph 12.2.

Suspension of Operations

12.4 Should the agreement for the unitization of Production contemplated herein not be approved by the ANP, pursuant to paragraph 12.2, the Development and Production of the relevant Pool will be suspended, unless otherwise approved by the ANP, at its sole discretion, until the unanimous and express agreement is obtained from all parties involved for this purpose.

D. CHINA

1. Model Contract for Third Onshore Bidding Round 1995 plus Annex (PEPS)

MODEL CONTRACT FOR THE THIRD ROUND OF INVITATION FOR BIDS FOR EXPLOITATION OF LAND PETROLEUM RESOURCES OF P.R. CHINA IN COOPERATION WITH FOREIGN ENTERPRISES
CHINA NATIONAL PETROLEUM CORPORATION
JUNE, 1995 BEIJING, CHINA

11.7 In the event of an Oil Field and/or Gas Field Straddling a Boundary, CNPC shall arrange for the Contractor and the neighboring parties involved to work out a unitized Overall development Program for such Oil Field and to help negotiate the relevant provisions thereof.

11.8 If a Petroleum-bearing trap without commercial value within the Contract Area can be most economically developed as a commercial Oil Field and/or Gas Field by linking it up with facilities located outside the Contract Area, then the development of such Oil Field shall be dealt with in the same manner as provided in Article 11.7 herein.

2. Model Contract for Fourth Offshore Bidding Round 1992 plus Annex (PEPS)

11.7 In the event of an Oil Field and/or Gas Field Straddling a Boundary, CNOOC shall arrange for the Contractor and the neighboring parties involved to work out a unitized Overall Development Program for such Field and to negotiate the relevant provisions thereof.

11.8 If a Petroleum-bearing trap without commercial value within the Contract Area can be most economically developed as a commercial Oil and/or Gas Field by linking it up with facilities located outside the Contract Area, then the development of such Field shall be dealt with in the same manner as provided in Article 11.7 herein.

E. COLOMBIA

1. 2000 Model Association Contract (PEPS)

Clause 15 – Utilization Of Associated Natural Gas

In the event that one or more Associated Natural Gas Fields are discovered, the Operator shall submit a project for the utilization of Natural Gas for the benefit of the Joint Operation within the three (3) years following the date of commencement of field development as defined by the Ministry of Mines and Energy. The Executive Committee will decide on the project, and if that is the case, it shall determine the schedule to carry it out. If the Operator does not submit a project within three (3) years or does not carry out the project approved in the terms determined by the Executive Committee, ECOPETROL may take, free of charge, all of the Associated Natural Gas available from the reservoirs being developed, as long as it is not required for the efficient development of the field.

Clause 16 - Unification

When an economically developable field continuously extends to another area or areas outside of the Contracted Area, the Operator, in agreement with ECOPETROL and other interested Parties, subject to the approval of the Ministry of Mines and Energy, shall formulate a unified development plan, in accordance with the engineering techniques for hydrocarbon development.

2. 2002 Model Contract (Frontier Areas), B Contract - For Exploration Projects (PEPS)

Clause 4 – Definitions

4.2 Field: Portion of the Contracted Area where there are one or several totally or partially superposed structures and/or stratigraphic traps with one or more producing Reservoirs, or in which the capacity to produce Hydrocarbons commercial quantities has been proven. Such Reservoirs can be found separated vertically and/or laterally by local geological barriers or impermeable strata, or both.

4.19 Hydrocarbons: All organic compounds, made up mainly by the natural blend of carbon and hydrogen, as well as all other accompanying substances or their by-products, excepting helium and rare gases.

4.20 Gaseouos Hydrocarbons: Comprise all Hydrocarbons produced in gaseous state on the surface and reported at standard conditions (1 atmosphere of absolute pressure and a temperature of 60˚ F).

4.21 Liquid Hydrocarbons: Comprise crude oil and condensate, as well as those produced in such state, as a result of treating gas, when required, reported at standard conditions.

Clause 15 - Utilization Of Associated Natural Gas

In the event that one or more Associated Natural Gas Fields are discovered, the Operator within the three (3) years following the date of commencement of field exploitation as defined by the Ministry of Mines and Energy, shall submit a project for utilization of Natural Gas for the benefit of the Joint Operation. The Executive Committee will decide on the project, and if that is the case, it shall determine the timing for execution of same. If the Operator does not submit any project within the three (3)

years or does not perform the project approved in the terms determined by the Executive Committee, ECOPETROL may take, gratuitously, all the Associated Natural Gas available from the reservoirs being developed, as long as it is not required for the efficient development of the field.

Clause 16 - Unification

When an economically exploitable field extends continuously to another area or areas out of the Contracted Area, the Operator, in agreement with ECOPETROL and the other interested Parties, subject to the approval of the Ministry of Mines and Energy, shall formulate a unified exploitation plan, which must conform to the engineering techniques for hydrocarbon exploitation.

F. ECUADOR

1. Supreme Decree No. 2967. RO / 711 of November 15th, 1978 - LAW ON HYDROCARBONS, 1978 (Consolidated up to 2000) (PEPS)

Article 85

The exploitation of fields common to two or more contract areas, in order to achieve greater efficiency and economy in the operation, shall require the execution of joint operational agreements, which shall be approved by the Ministry.

2. Hydrocarbon Operation Rules, 16 September 2002 (PEPS)

Article 51 - Unitized Exploitation

For the exploitation of common reservoirs in two or more contract areas it will be obligatory for the contractors in the affected contract areas, or for PETROECUADOR, if it acts for itself in an affected area, to celebrate, [Editor's note: "celebrate" probably means "enter into"] with the prior approval of the Ministry of Energy and Mines, operational agreements for unitized exploitation with the objective of improving the efficiency and economy of the operation.

The reservoirs that will be considered to be common, and therefore subject to the regime of unitized exploitation, are those qualified as such by the Ministry of Energy and Mines, based on technical and economic criteria.

The Ministry of Energy and Mines must issue its qualification according to the terms foreseen in Article 13 of these regulations, beginning with the presentation of the corresponding request on the part of the contractor and of

PETROECUADOR, if it is affected.

The operational agreements for unitized exploitation will be subject to the same contractual regime as the main contract and must be approved by the Ministry of Energy and Mines within the term of fifteen (15) days counting from the date that the reservoir was qualified as common by the Ministry of Energy and Mines.

When the involved parties do not reach definitive agreement, a provisional operational agreement can be made for a term of no longer than one hundred and eighty (180) days, that also must be previously approved by the Minister of Energy and Mines.

If the involved parties cannot agree on a provisional operational agreement, the Ministry of Energy and Mines, at the request of the parties, will establish the basic exploitation parameters.

Article 52 - Conservation

The exploitation of hydrocarbons will take place in such form that will avoid the excessive and improper use of natural energy in the reservoir, for which PETROECUADOR or the contractor, according to the applicable case, will conduct the exploitation by observing the rates approved by the National Directorate of Hydrocarbons, and will control the pressures, gas-oil ratios and water cut in order to technically and economically obtain the maximum final recovery of hydrocarbons.

3. Model Production Sharing Contract, 2002 (PEPS)

8.8. Unitized exploitation of common reservoirs: In conformity with the provisions of Articles 85 of the Law of Hydrocarbons and 51 of the Substitute Regulations for the Regulations of Hydrocarbon Operations, the exploitation of common reservoirs over two or more areas will be obligatory for the Contractors in the affected Contract Areas, or for PETROECUADOR if it is acting for itself in an affected area, who will execute, with the

prior approval of the Ministry of Energy and Mines, Operational Agreements for Unitized Exploitation with the objective of achieving greater efficiency and economy in the operation.

8.8.1. They will be recognized as common, and therefore subject to the regime of unitized exploitation, those reservoirs qualified as such by the Ministry of Energy and mines on a technical and economic basis, at the request of PETROECUADOR or of the involved Contractor or Contractors. While the reservoir is not qualified as common, the Contractor will have the right to exploit it at its own account and risk, as long as it does so within its Contract Area and it has not submitted a request for the corresponding declaration. From the date at which the reservoir is qualified as common by the Ministry of Energy and Mines, its exploitation will be carried out according to the Operational Agreement for Unitized Exploitation.

8.8.2. The Operational Agreements for Unitized Exploitation will be subject to the same contractual regime as the Principal Contract, and must be approved by the Ministry of Energy and Mines within the term of fifteen (15) days counted from the date on which the reservoir was qualified as common by the Ministry of this Branch.

8.8.3. When the involved parties do not reach accord on a definitive agreement, they can celebrate a Provisional Operational Agreement for a time period of no longer than one hundred and eighty (180) days, which must also be previously approved by the Ministry of Energy and Mines.

8.8.4. If the involved parties cannot reach accord on the Provisional Operational Agreement, the Ministry of Energy and Mines, at the request of the parties, will establish the basic exploitation parameters.

8.8.5. For establishment of the parameters, it will be taken into account that a Contractor will have the preferential option to act as the operating company of the common reservoir in the following cases:

a. If it had discovered the reservoir;

b. If the other contractor had executed a contract for Natural Gas when the common reservoir is a Crude Oil Reservoir;

c. If more than fifty per cent of the reserves of the common reservoir are within its Contract Area; and,

d. If the development plan for the common reservoir demonstrates that said reservoir can be developed and placed in production as soon as possible, with maximum efficiency and economy, in the terms provided for in Article 85 of the Law of Hydrocarbons.

8.8.6. The operational agreement shall contain, among other aspects, the following:

a. Well spacing, production rates, monitoring of pressures and production tests, and estimates of proven reserves;

b. Economic participation of the parties involved for the development and start up of production of the reservoir;

c. Updating of proven reserves and other operating conditions of the common reservoir;

d. Procedures for adjustment of sharing percentages, investments, costs and expenses in accordance with the periodic updating established in paragraph (c) above;

e. Procedure for the option of changing the operating company of the common reservoir, provided that such change does not negatively affect the continuity of operations with maximum efficiency and economy, in accordance with Article 85 of the Law of Hydrocarbons;

f. The obligations that shall be the responsibility of the operator company of the common reservoir; and

g. Establishment and functions of the Unitized Operating Committee to manage and supervise operations involving the common reservoir, to consist of representatives of the parties concerned and of PETROECUADOR, as applicable; and

h. The obligation of the operator to contract for the Insurance Policies necessary to protect the assets of the unitized area to the satisfaction of the non-operator.

8.8.7. During the time when Contractor is not the operating company of the common reservoir, Contractor shall not be responsible for the obligations that, according to the operational agreement for unitized exploitation, are the responsibility of the party that at that time is the operator of the common reservoir.

8.8.8. The State's production sharing agreed to in the main contracts cannot be affected or modified as a result of unitized exploitation and the execution and performance of the Operational Agreement.

8.8.9. If the common reservoir discovered is a Gas reservoir, Contractor shall, prior to executing any unitized exploitation agreement, execute with PETROECUADOR the respective additional contract for exploitation of Gas in accordance with the legal provisions in force.

4. Operating Agreement for the Unified Production of a Common Deposit, 2003

The State Oil Exploration and Production Company of _____, _____, and the Consortium or Association of BLOCK ____, consisting in _____, hereinafter collectively referred to as the Contractor, in turn represented by its Operator, the Company _____, have agreed to enter into this Agreement, contained in the following clauses:

Clause One: History

1.1. On (date), (State Company) and _____ signed a Participation Agreement for the Exploration of Hydrocarbons and the Production of Crude Oil in BLOCK ___ of the Ecuadorian Amazon region, agreement that was registered in the Hydrocarbons Registry on (date).

On (date), _____ transferred ____% of its rights and obligations under the aforementioned Agreement to _____, and on _____ the remaining ____% to _____, as it appears in the authorizations granted by the MINISTRY OF ENERGY AND MINES via Ministerial Agreements N° _____ and ____ of the aforementioned dates.

As per Ministerial Agreements N° ____ and ____, of (date) and (date) respectively, _____ assigned to _____ ___% of its rights and obligations under the Participation Agreement.

Based on the aforementioned assignments, the Contractor of BLOCK __ included, until (date), _____, with ___% of the rights and obligations of the Agreement as Operator of BLOCK ___, and _____, with the remaining ___%.

On the basis of the authorizations granted by the MINISTRY OF ENERGY AND MINES, via Ministerial Agreements N° ___ and ____, issued on (date) and (date) respectively, _____ and _____ transferred to _____ ___% of the rights and obligations each had under the Participation Agreement in BLOCK ___. As a consequence, to this date the Contractor of BLOCK ___ is constituted as follows: _____ with __%, as Operator of the Block; _____ with __%; and _____ with ___%.

1.2. On (date), the agreement to transfer ___% of the rights and obligations of the Participation Agreement for BLOCK __ in favor of the company _____ was entered on pages _____ to _____ of the Hydrocarbons Registry of the NATIONAL HYDROCARBONS OFFICE. Consequently, _____ is the new Operator of BLOCK ___ in lieu of _____.

1.3. Via Ministerial Agreement N° _____ dated _____, the MINISTRY OF ENERGY AND MINES agreed to authorize the shareholders of the company _____ to transfer _____ shares, representing the entire share capital of the company, in favor of the company _____ . The commercial act of transferring the shares represents _____% of the share capital of _____ and under the Participation Agreement for the Exploration of Hydrocarbons and the Production of Crude Oil of BLOCK ___is equivalent to ____% of the rights and obligations of the aforementioned company therein, as provided in Clause _____ of the aforementioned Participation Agreement.

1.4. The Contractor drilled the _____ well, located _____ of BLOCK ____, which turned out to be productive in the _____ and _____ deposits.

1.5. The Board of Directors of _____, via resolution N° _____ resolved to authorize the Manager of the OIL STATE COMPANY to sign an Agreement with Contractor to drill the _____ well in an area owned by PETROPRODUCCION, confirming the existence of the _____, and _____ deposits..

1.6. The OIL STATE COMPANY and _____ produced a study called "Technical Report Defining the Unified _____ Field between the OIL STATE COMPANY and _____".

1.7. Via Official Note N° _____ of (date), Engineers _____, Executive President of the OIL STATE COMPANY; _____, General Manager of _____.; and _____, General Manager of _____, asked the Ministry of Energy and Mines to qualify the _____ Field as a Unified Deposit.

1.8. Under Art. 85 of the Hydrocarbon Law and Art. 58 of the Regulations on Hydrocarbons Operations, the development of fields that are common to two or more areas of the Agreement requires the execution of operating agreements for unified production, with the purpose of achieving greater effectiveness and economies of scale in the operation.

1.9. As per Clause ____ of the _____ Agreement, the development of fields that are common to two or more areas requires that contractors and/or PETROECUADOR sign operating agreements for unified production, with the purpose of achieving greater effectiveness and economies of scale in the operation.

1.10. The MINISTRY OF ENERGY AND MINES, via Ministerial Agreement N° ___, dated ____, qualified the____ Deposit in the area of the ____ Field as common to the areas of Operation of both PETROPRODUCCION and the Contractor (Annex 5).

1.11 The Administrative Council of PETROECUADOR, via Resolution N° _____ of _____, on the basis of the report included in Memorandum N° _____ of _____, submitted by the Commission appointed for that purpose, and Memorandum N° ____, dated ____, resolved to authorize the Vice-president of PETROPRODUCCION to sign an Operating Agreement for the Unified Development of the _____ Field.

1.12 The MINISTRY OF ENERGY AND MINES, via Ministerial Agreement No. ___ of ____, approved the terms of the Agreement, with the observations included herein.

Clause Two: Definitions

For the purposes of this Operating Agreement, the following definitions are established, which will apply when they appear written in the text of the Operating Agreement with an initial capital letter, unless the text expressly establishes otherwise. The singular shall include the plural and vice-versa, as required by the context of this Operating Agreement. The terms not defined in this Clause shall apply as relevant pursuant to the definitions set forth in the Participation Contract of BLOCK ___ signed by the Parties.

2.1 **Appointed Staff**: the staff of PETROPRODUCCION appointed to work in the Shared Management of the Unified Deposit.

2.2. **Unified Deposit**: the area of the Unified _____ Field, qualified as such by the Minister of Energy and Mines which, projected vertically, contains the _____ Deposit, subject matter of this Operating Agreement, with the boundaries indicated in Annex 4.

2.3. **Audit and Delivery Center**: The Audit and Delivery Center shall be located in a location agreed by the Parties upon approval by the relevant Ministry.

2.4. **Shared Management Committee ("SMC")**: the body that shall control and supervise compliance with this Agreement, which shall consist in three Representatives of each Party, according to the Shared Management structure.

2.5. **Contractor**: The Consortium composed by the companies _____ and _____, represented by its Operator, the company _____, delegated herein by the Contractor to act on its behalf.

2.6. **Operating Agreement**: This instrument, including its

supporting documents and Annexes, as a whole called "Operating Agreement for the Unified Production of _____ Deposit in the _____ Field".

2.7. **Participation Agreement**: the Participation Agreement for the Exploration and Production of Hydrocarbons in BLOCK ___ of the Ecuadorian Oil Cadastral Map, signed between the Ecuadorian State, represented by PETROECUADOR, and the Contractor on _____, and recorded in the National Hydrocarbons Office on _____.

2.8. **Date of Validity**: The date of signing of this Operating Agreement.

2.9 **Effective Date**: The date of registration of this Operating Agreement in the Hydrocarbons Registry of the NATIONAL HYDROCARBONS OFFICE.

2.10. **Shared Management**: The joint operation of the Unified Deposit as per the structure agreed by the Parties and appearing in Annex 1, aimed at achieving greater effectiveness and economies of scale in the operation.

2.11. **Operator**: the Company _____.

2.12. **Parties**: PETROPRODUCCION and Contractor.

2.13. **Contractor's Share**: the percentage of the Audited Production corresponding to Contractor under Clause _____ of this Operating Agreement.

2.14. **PETROPRODUCCION's Share**: the percentage of the Audited Production corresponding to PETROPRODUCCION under Clause 8.4 of this Operating Agreement.

2.15. **PETROPRODUCCION**: The State Oil Exploration and Production Company of Ecuador.

2.16. **Allocation Period**: the period of two (2) years beginning with the appointment of the Appointed Staff designated to execute activities in the Unified Deposit, and terminating with the conclusion of those activities, except any extension of such period at the sole discretion of the SMC.

2.17. **Audited Production**: the production of Crude Oil of the Unified Deposit, measured in Barrels at the Audit and Delivery Center, less the volume of water and foreign matter attributable to the Unified Deposit, as determined by the Measurement System.

2.18. **Work Program**: the document presented by the Operator and approved by the SMC, detailing the works to be conducted in the Unified Deposit during one Fiscal Year, with its corresponding investment and costs and expenses budgets, as well as the estimated production of the Unified Deposit for the Fiscal Year.

2.19. **Representatives of Parties before the SMC**: three Representatives of Contractor and three Representatives of PETROPRODUCCION. The representatives of PETROPRODUCCION shall be appointed by the Vice-president of PETROPRODUCCION.

2.20. **Measurement System**: the procedure to be used by the Parties to determine the volume of production, as well as the density and viscosity of the Crude Oil produced in the Unified Deposit.

2.21. **Common Deposits**: the "_____" Deposit of the Unified _____ Field and any other common deposits inside the Unified ____ Field, provided they are qualified as such in the future by the relevant Ministry.

2.22. **Non-common Deposits**: Deposits inside the Unified Deposit that have no continuity on both sides of the boundaries separating PETROPRODUCCION's areas and BLOCK _____.

Clause Three: Object and Scope

3.1. The object of this Operating Agreement is to develop and produce Common ____ Deposit of the Unified _____ Field, under the proposed work programs and budget.

3.2. If during the development of the Unified Deposit new Common Deposits are discovered, qualified as such by the relevant Ministry, Contractor and PETROPRODUCCIÓN shall determine through the SMC the terms for their development and production and shall submit the relevant Development Plan.

3.3. If Non-Common Deposits are found inside the Unified Deposit, the Parties, through the SMC, shall determine by mutual agreement the terms for their development and production, and shall submit the relevant Development Plan to the Ministry for approval.

3.4 In order to obtain greater efficiency and economy of scale in the operation, the Parties agree that the administration of the Unified Deposit shall be handled as part of the administration of BLOCK ____. Therefore, the same rights and obligations of the Parties under the Participation Agreement are applicable to this Operating Agreement, in the relevant areas.

3.5 The financial and accounting statements of this Operating Agreement shall be handled independently from those of the Participation Agreement. Contractor shall finance, on his own account and risk, ____ % of the investments, costs and expenses for the development and production of the Unified Deposit.

3.6 The rights and obligations of the Parties with respect to the development and production of the Unified Deposit shall be the same rights and obligations of the Parties under the Participation Agreement, wherever applicable. In consequence, all agreements, contracts or covenants between PETROECUADOR and Contractor applicable to the Participation Agreement shall be applied in the same manner to this Operating Agreement.

3.7 Natural or associated gas produced but not used in the operations of the Unified Deposit shall be delivered at no cost to PETROPRODUCCION, who may in turn make the required investments to take advantage of the availability of this gas.

3.8 During the development of the Field and based on full technical justification, redeterminations of Proven Reserves of the Common _____ Deposit shall be made, which must be approved by the SMC and made official by the National Hydrocarbons Office (DNH), and which shall be used to estimate the shares according to the provisions of Clause 8 hereof, starting on the first quarter after the date of such officialization by the DNH.

Clause Four:Term

This Operating Agreement shall enter into force on the Effective Date established in Clause 2.9 and shall remain effective while the Participation Agreement remains valid, or until such date when it is terminated by any legal reason or by mutual agreement between the Parties, upon notification and approval by the relevant Ministry.

Clause Five: Shared Management

5.1 Operator and PETROPRODUCCION shall act under the Shared Management scheme from the Effective Date of this Operating Agreement.

5.2 Operator shall carry out all the activities subject matter of this Operating Agreement under the procedures established herein and the Participation Agreement, with such levels of efficiency and under the same standards of responsibility to which Contractor is bound under the Participation Agreement.

5.3. The Shared Management structure that has been agreed between the Parties is the structure established in Annex 1.

5.4. Operator and PETROPRODUCCION, through the SMC, commit to sign an agreement for the Appointment of Staff within thirty days (30) from the date of execution of this Operating Agreement, the agreement must specify, inter alia, the work relationship of the Staff Appointed to undertake the Shared Management of the Unified Deposit and shall be subject to the following conditions:

5.4.1. The responsibilities of the Appointed Staff, their skill levels, their experience, their functions, the Period of Appointment and their designation must be approved by the SMC on a case-by-case basis, in accordance with the requirements of Operator.

5.4.2. In order to facilitate the efficient provision of Appointed Staff by PETROPRODUCCION, Operator must:

5.4.2.1.Notify with at least 2 months advance notice to PETROPRODUCCION its requirements for the Appointed Staff, specifying the functions, responsibilities and skills of the required Staff and the Appointment Period.

5.4.2.2.Carry out an in-depth analysis of the resumes of each member of the personnel proposed by PETROPRODUCCION as part of the Appointed Staff. Operator may request, at its sole discretion, interviews with the personnel proposed prior to accepting them

definitively as part of the Shared Management team.

5.4.2.3. Furnish PETROPRODUCCION, at the end of the Appointment Period, with an evaluation of the Appointed Staff.

5.4.3. Operator and PETROPRODUCCION shall respect the Appointment Periods agreed. However, upon consultation between the Parties:

5.4.3.1. The SMC shall be entitled to terminate the Appointment Period, via at least one-month advance notice to PETROPRODUCCION, if the performance of the Appointed Staff is unsatisfactory in the conduction[*] of the work, or for lack of discipline, serious faults or failure to comply with the internal regulations of Operator. In this case, PETROPRODUCCION must replace the Appointed Staff within 15 days.

5.4.3.2. PETROPRODUCCION shall be entitled to replace the Appointed Staff upon approval by and two months' prior notice to the SMC.

5.4.4. The Appointed Staff must adhere to the timetables, regulations and policies of Operator, but the Appointed Staff shall remain in the payroll of PETROPRODUCCION during the entire Period of Appointment and shall be governed by the terms of their respective contracts with PETROPRODUCCION.

5.4.5. PETROPRODUCCION shall grant the Appointed Staff secondment with salary.

5.4.6. Operator must furnish the Appointed Staff with sufficient material and technical support to carry out their activities.

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[*] "conduction" probably means "conduct".

5.4.7. Operator shall provide the Appointed Staff with the required training for the performance of their functions, in accordance with its internal policies.

5.4.8. Remuneration of Appointed Staff: The amount of the remuneration shall be usually paid by PETROPRODUCCION to the Appointed Staff; subsequently, this amount shall be reimbursed to PETROPRODUCCION by Operator on the basis of the Agreement signed between the Parties.

5.4.9. The Appointed Staff shall be in charge of providing support to technical and support areas of the Unified Deposit and other areas as agreed by the SMC.

5.4.10 The period of Appointment of the Appointed Staff shall be two years, extendable at the discretion of the SMC.

5.4.11 The Appointed Staff shall attend training and development programs as approved by the SMC.

5.4.12 The Appointed Staff must submit to all the internal and corporate procedures and policies of Operator and other policies issued by the SMC.

5.4.13 The Appointed Staff shall have no less than 5 years experience in the hydrocarbons area.

5.4.14 The Appointed Staff shall report to the Management of the Unified Deposit Project.

Clause Six: The Shared Management Committee

6.1. The SMC shall be composed by three (3) Representatives of PETROPRODUCCION and three (3) Representatives of Operator. The membership, appointment and functions of the SMC are those set forth in the Operating Manual of

the Shared Management Committee, which is an integral part of this Agreement as Annex 3.

6.2. The SMC shall meet ordinarily once a month and extraordinarily whenever requested by any of its Members.

6.3. Summons to meetings of the SMC shall include the date, time, place, agenda and supporting documentation of issues to be addressed.

6.4. The Chairman of the SMC shall be appointed by the Operator of one of its Representatives.

6.5. The Secretary of the SMC shall be one of the Representatives of Operator. The Secretary shall keep the minutes that contain the resolutions adopted in the meetings, which shall be analyzed, approved and signed by the Representatives of the Parties and certified by the Secretary. The Secretary shall be responsible of the safekeeping of all the documentation of the SMC, which shall be kept in the premises of Operator.

6.6. The resolutions of the SMC shall be taken by a vote of the simple majority of Representatives. In case of a tied vote, the President of the SMC shall have the casting vote. In the meetings of the SMC, the Representatives of the Parties may be accompanied by their respective advisors, who shall have speaking but no voting rights.

Clause Seven: Powers of Shared Management Committee

Starting on the Effective Date of the Operating Agreement and notwithstanding other duties and powers granted herein, the SMC shall have the following powers:

7.1 To control the execution of this Operating Agreement, with the purpose of achieving greater efficiency and economies of scale in the operation.

7.2. To approve budgets, plans and the Work Program within the term specified in Annex 2.

7.3. To approve the technical and economic reports submitted by the Operator concerning the activities of the Unified Deposit.

7.4. To order the execution of audits and inspections as required to monitor the development of operations in the Unified Deposit, notwithstanding those made under the law and this Operating Agreement. In addition, the SMC shall assess the corresponding audit reports and give orders to carry out procedures as provided in this Operating Agreement.

7.5. To authorize Operator to sign contracts required for the operation of the Unified Deposit.

7.6. To select and assign tasks to the Appointed Staff that will be part of the Shared Management, as per the requirements of Operator.

7.7. To responsibly fulfill its duties and carry out its functions in accordance with the operating manual of the SMC.

7.8. To approve the manuals and guidelines as required for the development and production of the Unified Deposit.

7.9. To issue rules and procedures of administrative and operating nature with respect to the operation of the Shared Management.

7.10. To approve professional training and development programs, work schedules, assignment of tasks, compensations, responsibilities, rights and obligations of the Appointed Staff.

Clause Eight: Shares of Parties and Form of Payment

8.1. When Contractor receives its share of Crude Oil, Contractor may freely dispose and commercialize such Crude Oil either in the domestic or the foreign market.

8.2 Calculation of Contractor's Share: starting on the Effective Date, the Contractor's Share shall be calculated using the following formula:

$$PC = \frac{X \times q}{100}$$

Where: PC = Contractor's Share

q = audited production of Area of Unified Deposit.

X = Factor expressed in percentages, which shall be:

a) X=X1 when Proven Reserves of _____ Deposit are equal or less than _____ (00,000,000.00) barrels of crude oil.

b) X=X2 when Proven Reserves of _____ Deposit, approved by the SMC as per Clause 3.8 hereof, exceed _____ (00,000,000.00) barrels of crude oil, which shall be applied starting on the date of the quarter after the date of officialization by the DNH, as provided in Clause 3.8.

The X1 and X2 values are those contained in the "Table of X1 and X2 Factors" that is an integral part of this Agreement as Annex 7. For the calculation of the Contractor's Share, the values (X1 or X2) that correlate with the Range of Prices (US$/Bbl) of the Table that contains the Reference Price must be applied. The Reference Price shall be determined

according to the provisions of the Participation Agreement.

X factors corresponding the Contractor's Share, contained in the table in Annex 7 hereof, are net and final values, and shall therefore not be affected by the "Y" factor established in the Participation Agreement of BLOCK _____. Therefore, the calculation of the Share shall be made similarly to the example given in Annex 7 hereof.

Factor X shall be estimated by the Parties in advance every quarter on the basis of the Proven Reserves (Clauses 3.8 and 8.2) and of the Reference Price of the last month of the quarter immediately preceding.

The audited production of crude oil for the corresponding year or fraction of year in real values shall be used to calculate the final Share, which shall be reliquidated during the first quarter of the following fiscal year.

The volume of oil produced during extended production tests shall be added to the audited production of the first quarter, for liquidation purposes.

8.3 Gross Income of Contractor:

8.3.1 The Contractor's Share, calculated at actual sales prices, which in no way shall be less than the Reference Price for Crude Oil of the Area of the Participation Agreement, together with the proceeds generated by the rest of BLOCK ___ as established in Clause _____ of the Participation Agreement, shall constitute the gross income of Contractor, from which deductions shall be made and income tax shall be paid, as established in the Participation Agreement.

8.3.2 If Contractor chooses to receive its share in money for a period of no less than one year, upon agreement with PETROPRODUCCION, the Parties shall submit to the terms and conditions of the Payment Agreement provided in Clause _____ of the Participation Agreement; however, for tax purposes, the gross income of Contractor shall be the actual sales price.

8.4. Calculation of PETROPRODUCCION's Share: Starting on the Effective Date, the Share of PETROPRODUCCION (understood as the State's Share) shall be calculated as follows:

$$PP = \frac{(100 - X) \times q}{100}$$

Where:

PP = PETROPRODUCCION's Share

X and q have already been defined in Clause 8.2.

Clause Nine:Responsibility of Operator

Notwithstanding other responsibilities set forth in this Operating Agreement, Operator shall have the following responsibilities:

9.1 To diligently and efficiently conduct operations in the Unified Deposit, starting on the Effective Date of the Operating Agreement, in a continued and efficient manner as provided by the Operating Agreement, the decisions of the SMC, the Development Plan, Work Programs and approved budgets, using the best systems, techniques, practices and equipment generally accepted and used by the international oil industry.

9.2 To develop the operations of the Unified Deposit in strict compliance with the laws, regulations and standards related to the wellbeing of personnel, its security, health, hygiene, industrial safety, medical requirements, environmental protection, relations with the community and disaster prevention. Such laws, regulations and standards are considered minimum requirements. Thus, Operator shall apply additional measures as required by the circumstances.

9.3. To keep the SMC permanently informed of all the activities carried out during the validity of this Operating Agreement.

9.4. To maintain Crude Oil reserves found in the Unified Deposit, as well as the share in the production belonging to PETROPRODUCCION free from all encumbrances. Contractor may freely dispose of its share.

9.5. To choose the Appointed Staff adequate and competent to carry out operations in the Unified Deposit.

9.6. To keep accounting records of all activities concerning this Operating Agreement, with the purpose of accurately, precisely and faithfully reflecting investments, costs, expenses and earnings. To this end, the procedures of the Law of Internal Tax Regimen and its Regulations, Cost Accounting Regulations for Participation Agreements, and accounting principles generally accepted in the oil industry shall apply as relevant.

9.7. To respect the industrial property rights of third parties. To this end, industrial property rights mean inventions, designs, developments, discoveries, improvements (whether patented or not) or any intellectual right and property.

9.8. To select subcontractors under the contracting regulations and procedures of Operator.

9.9. To sign all sorts of contracts, upon authorization of the SMC, under the contracting regulations and procedures of Operator.

9.10 To produce all those reports required by competent authorities, except those which the Parties must produce separately according to the Law.

9.11 To keep in its custody and under its responsibility the stock of equipment, parts and materials, as well as the goods used in the operation of the Unified Deposit, striving to maintain them free of any encumbrance while under its control.

9.12 To take actions deemed necessary to solve Emergency Situations, Force Majeure or Acts of God; to notify the SMC within the following twenty-four (24) hours after such occurrences, and to ask the SMC to approve expenses made within ten (10) days after the termination of such actions. If such Emergency Situations, Force Majeure or Acts of God take place during holidays or non-working hours and notification is not possible within the following twenty-four (24) hours as mentioned above, notification to the SMC shall be made within the following next eight (8) business hours.

9.13. To purchase and maintain insurance coverage as required by the law and its regulations, and any additional insurance as determined by the SMC.

9.14 To require subcontractors to purchase and maintain insurance policies deemed adequate by Operator, where Contractor and PETROPRODUCCION shall appear as additional insureds. Such insurance policies must contain a waiver to the subrogation rights of the insurer against PETROPRODUCCION and Contractor.

9.15 To submit to the SMC, for its corresponding analysis and processing, a written request to revise the Work Program and/or budget as required.

9.16 To develop and propose changes in operating manuals and to submit them to the SMC for approval.

9.17 To submit annual audited financial reports to the SMC during the first two months of the Fiscal Year. Audits shall be made by an external auditing firm approved by the SMC. Audits shall include the general balance and the statement of investments, costs and expenses and other documents as decided by the SMC.

9.18 To defend itself, with resources from the Unified Deposit and upon authorization of the SMC, against complaints or lawsuits filed by third parties as a consequence of the operations in the Unified Deposit.

9.19 To submit to the Ministry of Energy and Mines for approval, on or before (date) of each year, the Work Program and the Budget.

Clause Ten: Confidential Information and Exchange of Information

10.1 Notwithstanding confidentiality regulations established in the Participation Agreement, plans, designs, drawings, data, technical and scientific reports and any other kind of information concerning operations and services procured with respect to the Unified Deposit shall be treated by the Parties in a confidential manner, so that their content, whether total or partial may not be disclosed in any way whatsoever to third parties without the prior written consent of PETROPRODUCCION, in the case of Contractor, and upon written consent of Contractor, in the case of PETROPRODUCCION. This confidentiality shall not apply to information which the Parties must furnish under the law and this Agreement, nor to information which they must furnish to subordinate firms that participate or are consulted with respect to this Operating Agreement, including auditors, legal advisors, financial institutions, or due to

requirements made by domestic or foreign stock market regulating authorities.

10.2 The Parties shall take measures reasonably necessary to ensure that their workers, agents, representatives, agents, arbitrators, consultants and subcontractors comply with the same confidentiality obligation.

10.3 Operator may exchange geophysical information, geological information about wells, interpretations, check samples, samples, reports and other documents obtained by virtue of the operations carried out in the Unified Deposit, upon approval by the SMC.

10.4 The provisions of this Clause shall remain in force five (5) years after the termination of the Participation Agreement.

Clause Eleven: Transfers and Assignment

11.1 Transfer of this Operating Agreement or assignment to third parties of the rights and obligations arising from this Operating Agreement by Contractor shall be subject to the terms and conditions contained in the Participation Agreement.

11.2 If by legal mandate or agreement, PETROPRODUCCION assigns wholly or partially its rights and obligations arising from this Operating Agreement to third parties, the assignee must, prior to the assignment, bind himself expressly to comply with the terms and conditions of this Operating Agreement.

Clause Twelve: Duties, Taxes, Worker's Share[*] and Contributions

12.1 Contractor's taxes and worker's share shall be paid in accordance with Clause ____ of the Participation Agreement.

12.2 Tax, fiscal or labor duties, rights, obligations and responsibilities of the Parties shall be due severally but not jointly, and each Party shall be responsible only of its obligations, as provided in this Operating Agreement.

12.3 It is not the purpose or the intention of this Operating Agreement to create a legal body or entity, or a corporation, partnership, association or trust, or to authorize the Parties to act as agents of the other Party (except that Operator is authorized to act on behalf of the Parties under this Operating Agreement).

12.4 Each Party is individually and solely responsible for any taxes it may owe to any entity or agency of the Government of Ecuador or to any other government, or for the worker's share with respect to the operations of the Unified Deposit.

12.5 Contractor shall not be bound to pay any additional sums by way of the contributions established in Clause _____ of the Participation Agreement.

Clause Thirteen: Insurance

Operator shall purchase insurance coverage as required for the operation of the Unified Deposit, as indicated in Clause _____, paragraph _____ of the Participation Agreement.

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[*] "worker's share" probably means Labor Profit Sharing, which is one of the applicable taxes in Ecuador.

Clause Fourteen: Settlement of Disputes

Disputes arising as a consequence or with respect to this Operating Agreement shall be settled as per the provisions contained in Clause _____ of the Participation Agreement.

Clause Fifteen: Communications and Notices

Notices between the Parties shall be in writing, in Spanish, and shall be deemed as sent only upon evidence of reception at the following addresses:

PETROPRODUCCION:

Gaspar Cañero Av. 6 de Diciembre
Tel: 2440-380
Fax: 2440-381
Quito, Ecuador

CONTRACTOR:

_____ S.A.
Address
Tel:
Fax:
Quito, Ecuador

Clause Sixteen: Termination of Operating Agreement

This Operating Agreement shall terminate for the following causes:

a) Termination of Participation Agreement, as per Clause ____ thereof.

b) Abandonment of operations in the Unified Deposit by Operator due, inter alia, to the depletion of the total reserves of the Unified _____ Field, and only in this case upon mutual certification between the Parties and approval of the National Hydrocarbons Office.

c) Upon declaration of revocation of Participation Agreement.

d) By mutual agreement between the Parties.

Clause Seventeen: Incorporation of Regulations

17.1 The terms and conditions of the Participation Agreement shall apply to everything not expressly provided for otherwise in this Operating Agreement. Such terms and conditions are incorporated and form an integral part of this Operating Agreement, as if written herein, except as regards Contractor's and PETROPRODUCCION's Shares. In case of discrepancy between the provisions of the Operating Agreement and the Participation Agreement, the latter shall prevail.

17.2 Operator shall submit this Operating Agreement for the approval of the relevant Minister, as provided in Articles eighty-five (85) of the Hydrocarbons Law, fifty-eight (58) of the Regulations on Hydrocarbon Operations, and three (3) of Ministerial Agreement N° ___.

Clause Eighteen: Severability

If any Clause or provision of this Operating Agreement is deemed not valid for any reason, such invalidity shall not affect the validity or enforcement of the rest of the Operating Agreement.

Clause Nineteen: Waiver

Any waiver at any time by any Party to demand compliance of a provision under this Operating Agreement shall not be a precedent and shall not be construed as a waiver to demand compliance with such provision in the future.

Clause Twenty: Supporting Documents

The following supporting documents are included as annexes to this Operating Agreement:

20.1 Certified copy of appointment of Vice-president of PETROPRODUCCION.

20.2 Certified copy of Resolution of Administrative Council of PETROECUADOR authorizing the execution of this Operating Agreement.

20.3 Certified copy of authorization granted by _____ in favor of its legal representative enabling him to sign this Operating Agreement.

20.4 Certified copy of power of attorney granted by _____ in favor of its legal representative, authorizing him to sign this Operating Agreement.

20.5 Certified copy of the power of attorney granted by _____ in favor of its legal representative, authorizing him to sign this Operating Agreement.

20.6 Copy of Ministerial Agreement N° _____ issued by the Ministry of Energy and Mines on _____, approving the Agreement.

20.7 Official Note N° _____ PETROECUADOR, dated _____.

20.8 Memorandum N° _____ of the National Hydrocarbons Office, dated _____, containing the technical and economic report.

20.9 Memorandum N° _____ of the Ministry's Legal Office, dated _____.

Clause Twenty-One: Annexes

The following annexes are an integral part of this Operating Agreement:

Annex 1. Shared Management Committee Flowchart

Annex 2. Financial and Accounting Procedures

Annex 3. SMC Operating Manual

Annex 4. Boundaries of Unified Deposit.

Annex 5. Ministerial Agreement N° ____ of _____, establishing that the "_____" Deposit, located in _____ Field, is common to BLOCK _____ and to the area of PETROPRODUCCION.

Annex 6. Formats of Financial Accounting Procedures

Annex 7. Table of X1 and X2 Factors for the Calculation of Contractor's share. Examples of calculation of Contractor's share.

This is the definitive document signed by the Parties. Therefore, it shall prevail upon any other document.

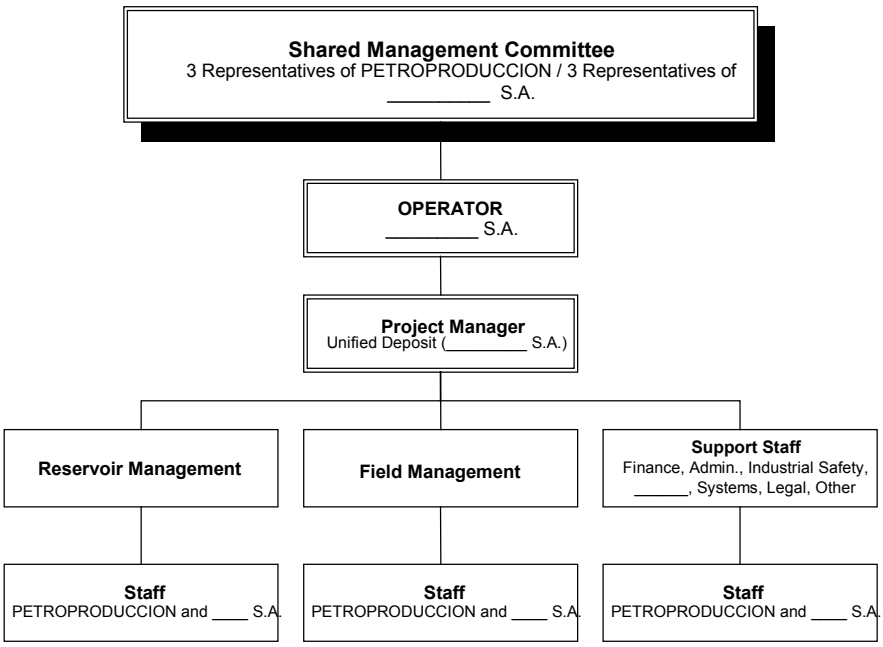
In witness of the commitments contained in this Operating Agreement, the Parties have signed it in ten identical copies in the city of Quito, on _____ __, _____.

PETROPRODUCCION_____

COMPANY 1 S.A. **COMPANY 2 S.A.**

Annex 1

Shared Management Flowchart



Annex II

Financial Accounting Procedures

1. Work Program and Budget

1.1 Operator shall submit the first Work Program and Budget to the SMC for the remaining duration of the respective Fiscal Year within thirty (30) calendar days after the Effective Date of the Operating Agreement. The SMC shall analyze and approve the documents within a maximum term of ten (10) calendar days from the date of reception thereof.

1.2 No later than (date) of each Fiscal Year, Operator shall submit to the SMC the recommended Work Program and Budget for the following Fiscal Year, attaching all the annexes, calculation bases, cash flows in Dollars, work schedules, maps, etc., and the respective supporting documents of the Budget in Dollars. The SMC shall analyze and approve them before _____ of each Fiscal Year.

1.3 Each Budget shall be subdivided in the categories and items included in the applicable Accounting Regulations.

1.4 Operator shall do everything it is power to carry out the operations provided for in the corresponding Work Program and Budget.

2. Financial and Accounting Information

No later than during the first fifteen (15) working days of each quarter, Operator shall furnish the SMC, using the formats detailed in Annex 6, the following:

2.1 a.- Statement of operating costs and expenses in Dollars, according to applicable accounting regulations and accounting principles generally used in the oil industry,

including budgetary implementation of operating costs and expenses.

b.- Statements of investments in development and production activities in Dollars, for information purposes, including budgetary implementation of development and production investments.

c.- The report on activities carried out and the explanation of significant deviations in budgetary implementation. The SMC may request in writing any additional documentation and information deemed relevant.

3. Accounting Records

3.1 Operator shall open and keep independent accounting records in Dollars in accordance with the provisions of applicable Accounting Regulations.

3.2 Books related to the Unified Deposit shall be kept in Dollars. The accounting registration of transactions shall be made at cost.

4. Audits

4.1 An external audit of the financial reports shall be conducted each year via an agreement signed by Operator with a well-known auditing firm, legally authorized to carry such work in Ecuador. The results of these external audits and the comments made by Operator shall be delivered by Operator to the SMC within a maximum term of thirty (30) calendar days after receiving the audit report. If the SMC believes that a specific issue requires additional investigation, Operator shall be asked to clarify its comments within the following thirty (30) calendar days, or, if necessary, the SMC shall recommend Operator to take the required remedial measures.

4.2 If as a result of the external audit, authorized by the SMC, financial-accounting adjustments or changes in field operating procedures that affect the Parties are necessary, the concomitant adjustments and actions shall be carried out by Operator.

4.3 The cost of audits authorized by the SMC shall be charged to the Accounting records of the Unified Deposit.

5. Stocks of Equipment, Parts and Materials of Unified Deposit

5.1 Procurement

Stocks of Equipment, Parts and Materials purchased to develop the Unified Deposit shall be recorded at cost, after deducting all the rebates actually received by Operator or by Subordinate* Firms. The cost shall include fees for purchases to third parties, charges for inspection and other procedures, export agents' fees, transportation costs, insurance, loading and unloading, import duties and permits and other procurement related costs, as well as the relevant taxes.

5.2 Use of Equipment, Parts and Materials

The Stocks of Equipment, Parts and Materials required for the operation of the Unified Deposit shall be transferred from the Accounting inventories of the Unified Deposit to the corresponding cost centers, if any. Likewise, the Parties may supply Equipment, Parts and Materials from their own stocks for the execution of operations in the Unified Deposit in the following terms:

5.2.1 New goods shall be quoted at the Dollar equivalent value in the books of the Party transferring such goods.

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* "Subordinate" in this instance probably means "Affiliated".

5.2.2 Used goods shall be quoted at the price previously agreed by the Parties, keeping in mind the condition of such goods.

5.3 Guarantee of material supplied by the Parties

The Parties do not guarantee the proper functioning of goods supplied. If goods are defective, Operator reserves the right to request the replacement of such goods to the Party or to file a claim directly with the manufacturer or supplier, if possible.

6. Disposal of materials

6.1 If Operator believes that any item(s) in the Stocks of Equipment, Parts and Materials are no longer necessary to carry out the operations in the Unified Deposit, Operator may dispose of such items, provided the original purchasing cost of such item(s), individually or as a whole does not exceed _____ Dollars (US$ 00,000.00). The disposal of any item(s) worth in excess of such amount, individually or as whole, shall require the prior approval of the SMC.

6.2 Operator may not withdraw from the Unified Deposit any tanks, buildings or other important items belonging to the Unified Deposit without the approval of the SMC. Operator may dispose of junk and other waste upon compliance with legal procedures.

6.3 Goods disposed by Operator under this Agreement shall be entered in the accounting records of the Unified Deposit and shall be included in the same month in which the material is deleted from the list of assets in the accounting records of the Unified Deposit.

6.4 Any complaint by purchaser requiring the recalling of any good due to defect or other reasons shall be deducted from the accounting records of the Unified Deposit at the time Operator pays.

7. Transfer or Lease of Goods of Unified Deposit

Goods of the Unified Deposit, which the Parties agree to transfer or lease, shall be valued at the price determined by the Parties, upon approval by the SMC.

8. Physical Inventories

8.1 Periodical physical inventories of facilities and equipment shall be made once these assets are completed or installed and thereafter at least every three (3) years. Inventories of stock in storage shall be made by Operator at least once (1) every fiscal year.

8.2 Notice of intention by Operator to make an inventory shall be given to the Parties at least thirty (30) calendar days before inventory begins, so that the Parties may be represented when such inventory is made.

8.3 Any Party that, after being duly notified, is not represented during the physical inventory, shall accept the inventory made by Operator, who will furnish such Party with a copy thereof.

8.4 Inventories shall be reconciled and for this purposes the corresponding adjustments shall be made in the accounting records of the Unified Deposit, and Operator shall make a list of surpluses and deficits on the basis of the inventory made. A copy of the aforementioned list shall also be furnished to the SMC.

8.5 Operator shall make inventory adjustments corresponding to surpluses and deficits in the accounting records of the Unified Deposit.

8.6 Expenses incurred by the presence of the Parties during the execution of the inventory shall not be charged to the accounting records of the Unified Deposit.

9. Revision of Financial Accounting Procedures

The provisions of these Financial Accounting Procedures may be regulated and revised by the SMC, provided such acts do not affect the Operating Agreement. All proposed revisions shall be made in writing and, if they are approved by the Parties, an instrument of amendment shall be signed indicating the date of entry into force of such revisions.

Annex 3

Operating Manual of Shared Management Committee

1. This manual sets forth the operating regulations of the SMC and is an integral part of the Operating Agreement.

2. The definitions given in the Operating Agreement and the Participation Agreement are equally applicable to this manual.

3. The duties and powers of the SMC are those established in Clause ___ of the Operating Agreement and shall be exercised in accordance with this manual. In case of conflict between the provisions of the Operating Agreement and this manual, the former shall prevail.

4. Operator shall carry out the functions of coordination and secretariat of the SMC.

5. Each Party shall appoint three (3) senior representatives. The Representatives of PETROPRODUCCIÓN shall be career functionaries of the Unified Deposit Administrative Unit, professionals with a university degree and at least ten (10) years' experience in the oil industry. The Representatives of PETROPRODUCCIÓN shall be appointed by the Vice-president of PETROPRODUCCION and they shall remain in office for four consecutive years. They may be removed by the SMC using the same procedure established for the Appointed Staff, as per Clause 5.4.3.1 of the Operating Agreement. Each Party shall inform the other Party in writing the names of the Representatives appointed by each. The Representatives of each Party are authorized to communicate the decisions taken by such Party and to bind such Party in issues duly submitted before the SMC.

6. At any time and upon written notice to the other Party, Operator may replace Operator's Representatives.

7. If the Representatives of any of the Parties are unable to attend a meeting of the SMC, such Representatives may cast their vote on issues included in the agenda, via a written notice addressed to the SMC, except in the case provided in Paragraph 18.

8. Each Representative may attend any meeting of the SMC, accompanied by any advisors as required. However, such advisors shall have no voting rights.

9. The Chairman of the SMC shall be one of the Representatives of Operator, and such Chairman shall be appointed by Operator.

10. The Secretary of the SMC shall be one of the Representatives of Operator, who shall be responsible of keeping the Minutes containing the resolutions adopted in the sessions, which shall be considered, approved and signed by the Representatives of the Parties and certified by the Secretary. The Secretary shall be responsible of the safekeeping of all the documentation of the SMC, which shall be kept in Operator's facilities.

11. The SMC shall meet once a month during the term of this Agreement. However, either Party may, at any time through its Representatives, summon an extraordinary meeting of the SMC, via a written notice sent at least four (4) calendar days prior to the date of the meeting. Such notice shall include a list of the issues to be discussed in the meeting. The other Party may add other issues to the list, via a notice sent to the Party that proposed the meeting two (2) calendar days prior to the date of such meeting.

12. In non-extraordinary meetings, the SMC shall not take any decision on issues not included in the agenda, unless the

Parties unanimously decide to consider the issue not included.

13. Notwithstanding the foregoing, the SMC may validly meet without need of formal summons, if all the Representatives of both Parties are present and unanimously agree and approve the issues on the agenda for such meeting.

14. SMC meetings shall take place in the city of Quito or in the place or places decided by the SMC.

15. Within fifteen (15) calendar days after the meeting, the Secretary of the SMC shall send to the Representatives, for their approval and signing, the minutes of the meeting, stating the issues addressed and the decisions taken by the SMC.

16. If during the fifteen (15) calendar days after the date the minutes are received, any Representatives have not expressed their approval or objection to the proposed minute, such Representatives shall be deemed as having approved the minute.

17. Via a notice sent to the Representatives of the SMC, a proposal for a decision may be submitted to the SMC without need for a meeting. Decisions adopted without a meeting shall be recorded by the Secretary of the SMC in the minute of the following SMC meeting.

18. Whenever it is necessary to vote via swift communication means (e.g., cable, telex, facsimile or telephone), each Representative of the SMC shall confirm such call in writing about any proposal submitted for consideration, including, without limitation, proposals to deepen, complete, detour, plug, fill, test or abandon a well where drilling equipment is present. The Representatives of the SMC shall cast their vote through this swift communication means within twenty-four

(24) hours after having been notified by the Representative requesting the vote on such issue.

19. Other proposals that, for justified reasons, require immediate action, shall include a reasonable term within which the Representatives of the SMC must cast their vote.

20. SMC decisions shall be taken by the affirmative vote of the simple majority of its Representatives. If any Representative of the SMC abstains or refrains from voting, his vote shall be deemed to be negative, except in cases where this Operating Agreement expressly stipulates that the absence of an answer is deemed as an approval or as an affirmative vote. Each of the Representatives of the SMC is entitled to one (1) vote.

21. In case of a tie in the votes of the SMC, the Chairman of the SMC shall have the casting vote.

22. The resolutions adopted by the SMC, within the scope of its powers, are final.

23. The provisions of this manual may be amended by the SMC without need of amending this Operating Agreement. All amendment proposals must be made in writing. If any amendment is approved by the SMC, an amendment instrument shall be prepared including the date of entry into effect of such amendments, which shall be signed by the Representatives of the SMC and notified to the legal representatives of the Parties.

Annex 4

Map of Boundaries of the Unified Deposit
Unified Deposit

Annex 5

Ministerial Agreement N° of

Annex 6

Formats for Financial and Accounting Information

Annex 7

Table of X1 and X2 Factors

Price Range (US$/BBL)	**X1**	**X2**
Less than 15.—	70.00	69.00
Greater or equal to 15.— and less than 16.—	66.00	65.00
Greater or equal to 16.— and less than 17.—	65.00	64.00
Greater or equal to 17.— and less than 18.—	62.00	61.00
Greater or equal to 18.— and less than 19.—	61.00	60.00
Greater or equal to 19.— and less than 20.—	60.00	59.00
Greater or equal to 20.— and less than 21.—	58.00	57.00
Greater or equal to 21.— and less than 22.—	56.00	55.00
Greater or equal to 22.— and less than 23.—	54.50	53.50
Greater or equal to 23.— and less than 24.—	53.00	52.00
Greater or equal to 24.—	50.50	49.50

Note:

X1 shall be used when the Proven Reserves of the _____ Deposit are equal or less than _____ (00,000,000,00) barrels of crude oil.

X2 shall be used when the Proven Reserves of _____ Deposit, approved by the SMC as per Clause 3.8 of this Agreement, are greater than _____ (00,000,000,00) barrels of crude oil, and shall be applied starting on the date of the quarter after the date such reserves are made official by the DNH, as per the provisions of Clause 3.8.

Annex 7 (continued)

Examples of Calculation

Example a) this example shows how the shares will be calculated from the beginning of Shared Management Operations and as long as the SMC does not approve amendments in Proven Reserves in addition to those initially projected of sixty-five million eight-hundred thousand (65,800,000.00)barrels of crude oil and these reserves are made official by the DNH as per the provisions of clauses 3.8 and 8.2 of the Agreement.

q = Audited Quarterly Production = **1,798,048,000**

Referential Price of the Quarter (US$/Bbl) = **22,534**

Referential Price for Quarter corresponds to Price Range (US$/Bbls): **Greater or equal to 22.-- and less than 23.--,**
Of Table in **Annex 7,** therefore, applicable values are:

Applicable Factor: X = X1 = **54,500**

Contractor's Share in Barrels for Quarter is: $PC = \frac{X \times q}{100} =$ **979,936,160**

PETROPRODUCCION's Share in Barrels is: $PP = \frac{(100 - X) \times q}{100} =$ **818,111,840**

G. EGYPT

1. Decree 758 of 1972, Executive Regulations of Law 66/1953 Concerning Mines and Quarries

Article – 45

If it transpires that the producing layer extends into areas concerning more than one Exploiting Parties, the Organization may ask the concessionaires to agree among themselves on carrying out joint efforts toward achieving the best exploitation of this Layer, according to the norms observed and recognized in Oil Industry, considering that the said layer represents one oilfield. If the Parties to the relation fail to reach agreement within SIX months from the date they are notified thereof by the organization, the latter may then set the rules it considers to be realizing this purpose, which rules shall bind all parties to the relation. In any case, a prior approval from the Organization shall be obtained concerning any agreement reached in this respect between the parties to the relation.

2. Model Concession Agreement, 1998 (Barrows Supplement No. 124, N. Africa)

Article III – Grant of Rights & Terms

(e) Development operations shall upon the issuance of a Development Lease granted following a Commercial Oil Discovery, be started promptly by Operating Company and be conducted in accordance with good oil field practices and accepted petroleum engineering principles until the field is considered to be fully developed, it being understood that if associated gas is not utilized, EGPC and CONTRACTOR shall negotiate in good faith on the best way to avoid impairing the production in the interests of the parties.

In the event no Commercial Production of Oil in regular shipments is established in any Development Block within four (4) years from the date of the Commercial Oil Discovery, such Development Block shall immediately be relinquished, unless there is a Commercial Gas discovery on the Developmental Lease. Each Development Block in a Development Lease shall be considered as participating in the Commercial Production referred to above.

Development operations in respect of Gas and Crude Oil in the form of condensate or LPG to be produced with or extracted from such Gas shall, upon the signature of a Gas Sales Agreement or commencement of a scheme to dispose of the Gas, whether for export as referred to in Article VII or otherwise, be started promptly by Operating Company and be conducted in accordance with good gas field practices and accepted petroleum engineering principles and the provisions of such Agreement or scheme. In the event no Commercial Production of Gas is established in accordance with such Gas Sales Agreement or scheme, the Development Lease relating to such Gas shall be relinquished, unless otherwise agreed upon by EGPC.

If, upon application by CONTRACTOR it is recognized by EGPC that Crude Oil or Gas is being drained from the Exploration block under this Agreement into a Development Block on an adjoining concession area held by CONTRACTOR, the Block being drained shall be considered as participating in the Commercial Production of the Development Block in question and the Block being drained shall be converted into a Development lease with the ensuing allocation of costs and production (calculated from the Effective Date or the date such drainage occurs, whichever is later) between the two Concession Areas. The allocation of such costs and production under each Concession Agreement shall be in the same portion that the recoverable reserves in the drained geological structure underlying each Concession Area bears to the total recoverable reserves of such structure underlying both Concession Areas. The production allocated to a concession area shall be priced according to the concession agreement covering that concession area.

Article XI – Saving of Petroleum and Prevention of Loss

(a) Operating Company shall take all proper measures, according to generally accepted methods in use in the oil and gas industry to prevent loss or waste of Petroleum above or under the ground in any form during drilling, producing, gathering, and distributing or storage operations. The GOVERNMENT has the right to prevent any operation on any well that it might reasonably expect would result in loss or damage to the well or the Oil or Gas field.

Upon completion of the drilling of a productive well, Operating Company shall inform the GOVERNMENT or its representative of the time when the well will be tested and the production rate ascertained.

Except in instances where multiple producing formations in the same well can only be produced economically through a single tubing string, Petroleum shall not be produced from multiple oil bearing zones thorough one string of tubing at the same time, except with the prior approval of the GOVERNMENT or its representative, which shall not be unreasonably withheld.

Operating Company shall record data regarding the quantities of Petroleum and water produced monthly from each Development Lease. Such data shall be sent to the GOVERNMENT or its representative on the special forms provided for that purpose within thirty (30) days after the data are obtained. Daily or weekly statistics regarding the production from the Area shall be available at all reasonable times for examination by authorized representatives of the GOVERNMENT.

Daily drilling records and the graphic logs of wells must show the quantity and type of cement and the amount of any other materials used in the well for the purpose of protecting Petroleum, gas bearing or fresh water strata.

3. 1997 Concession Agreement For Petroleum Exploration And Exploitation Between The Arab Republic Of Egypt And The Egyptian General Petroleum Corporation And Norsk Hydro Exploration Egypt a.s And Kufpec (Egypt) Limited (Ras El Hekma Area, Western Desert, A.R.E.) (Barrows Supplement No. 129, N. Africa).

Article III – Grant of Rights and Terms

Development operations in respect of Gas and Crude Oil in the form of condensate or LPG to be produced with or extracted from such Gas shall, upon the signature of a Gas Sales Agreement or commencement of a scheme to dispose of the Gas, whether for export as referred to in Article VII or otherwise, be started promptly by Operating Company and be conducted in accordance with good gas field practices and accepted petroleum engineering principles and the provisions of such Agreement or scheme. In the event no Commercial Production of Gas is established in accordance with such Gas Sales Agreement or scheme, the Development Lease relating to such Gas shall be relinquished, unless otherwise agreed upon by EGPC.

If, upon application by CONTRACTOR it is recognized by EGPC that Crude Oil or Gas is being drained from the Exploration block under this Agreement into a Development Block on an adjoining concession area held by CONTRACTOR, the Block being drained shall be considered as participating in the Commercial Production of the Development Block in question and the Block being drained shall be converted into a Development Lease with the ensuing allocation of costs and production (calculated from the Effective Date or the date such drainage occurs, whichever is later) between the two concession areas. The allocation of such costs and production under each concession agreement shall be in the same portion that the recoverable reserves in the drained geological structure underlying each concession area bears to the total recoverable reserves of such structure underlying both concession areas. The production allocated to a concession area shall be priced

according to the concession agreement covering that concession area.

Article XI – Saving of Petroleum and Prevention and of Loss

(a) Operating Company shall take all proper measures, according to generally accepted methods in use in the oil and gas industry to prevent loss or waste of petroleum above or under the ground in any form during drilling, producing, gathering and distributing or storage operations. The GOVERNMENT has the right to prevent any operation on any well that it might reasonably expect would result in loss or damage to the well or the oil or gas field.

(b) Upon completion of the drilling of a productive well, Operating Company shall inform the GOVERNMENT or its representative of the time when the well will be tested and the production rate ascertained.

H. INDONESIA

1. Decree NO. 402/D/D/MIGAS/1967

Oil Companies will be obliged to explore and exploit structures that may contain oil and gas in commercial quantities that lie under several contiguous Contract Areas under the following conditions:

Article 1:

1. Pursuant to the provision Article 7(3) of Law 44 of 1960, the Oil Companies are prohibited from carrying out the mining business outside their Contract Areas.

2. Exploration and exploitation as mentioned in paragraph 1 above may be carried out in a Unitized way.

3. The Director General of Oil and Gas, based on his own judgment, or at the request of one or more of the Oil Companies concerned, and after considering the views of all relevant parties, has the right to decide when the exploration and exploitation of the structure [started] in accordance with the method provided by [translation unclear].

Article 2:

1. The method of cost distribution for the production during the exploration and exploitation of the structures and the applicable procedures will be stipulated by the Oil Companies concerned subject to the approval of the DG.

2. In the event that the Oil Companies concerned cannot agree on the cost and production distribution

methods, and the implementation of the procedures mentioned above, the DG will decide.

Article 3:

1. Oil Companies that do not comply with the implementation of this Decree will be subject to the necessary sanctions or the provisions of Article 20(b) of Law No. 44 of 1960.

Article 4:

Anything not regulated by this Decree will be further regulated.

I. NIGERIA

1. Petroleum (Drilling and Production) Regulations, 1969 (Barrows Supp. No. 22, S. & C. Africa)

Article 47

(1) If at any time during the term of a license or lease -

(a) the Commissioner, after consultation with the licensee or lessee (referred to in this regulation as "the grantee"), is satisfied that the relevant area or any part thereof forms part of a single geological petroleum reservoir (referred to in this regulation as "the oilfield") in respect of other parts of which any other license or lease is in force, and that the oilfield is susceptible of being developed as a unit in accordance with good oilfield practice, and

(b) the Commissioner considers that it is in the interests of Nigeria, the grantee and the licensees or lessees of any other part of the oilfield (those licensees or lessees being referred to in this regulation as "the other parties") in order to secure the maximum ultimate recovery of petroleum that the oilfield should be worked and developed as a unit in cooperation by all those who hold a lease or license over any part thereof,

the following paragraphs of this regulation shall apply.

(2) The grantee shall, upon being so required by the Commissioner by a notice in writing specifying the other parties, cooperate with the other parties in the preparation of a scheme (referred to in this regulation as "the development scheme") for the working and development of the oilfield as a unit by the grantee and the other parties in cooperation, and shall jointly with the other parties submit the development scheme for the approval of the Commissioner.

(3) The said notice shall contain a description, by reference to a map, of the area in respect of which the Commissioner requires the

development scheme to be submitted for his approval, and shall state the period within which the development scheme is required to be so submitted.

(4) If the development scheme is not submitted to the Commissioner within the period limited in that behalf by the said notice, or if the development scheme on being submitted in pursuance of paragraph (3) above is not approved by the Commissioner, the Commissioner shall himself prepare the development scheme in a manner which in his opinion is fair and equitable to the grantee and the other parties.

(5) When the development scheme has been -

(a) submitted under paragraph (3) above and duly approved, or

(b) prepared by the commissioner under paragraph (4) above,

the grantee and the other parties shall perform and observe all the terms and conditions thereof.

2. *Service Contract Of September 1979 Between A Private Company (Name Confidential) & Nigerian National Petroleum Corporation (NNPC) (Barrows Supp. No. 65, S. & C. Africa)*

Article 10

10.0 Joint Exploration and Production Operations

10.1 Where a structure or prospect identified by a CONTRACTOR straddles the boundary or boundaries of the Contract Areas, between CONTRACTOR and an existing Licensee or Lessee, CONTRACTOR shall promptly report same to NNPC and NNPC shall use its best endeavours to reach an agreement on a joint Exploration and Appraisal programme with such holder(s) of the licence or lease, as the case may be, covering the area(s) in which such structure or prospect occurs.

10.2 Where a structure or prospect identified by CONTRACTOR straddles the boundary or boundaries between the Contract Area, and another area held under another service contract with NNPC, CONTRACTOR shall promptly report same to NNPC who shall endeavour to have the parties involved reach an agreement on a joint Exploration and Appraisal programme. For that purpose the parties involved shall jointly review all available geophysical, geological and other relevant information at their disposal, choose the optimum location for a joint exploration well to minimize costs, and jointly finance the drilling of the first exploratory well, and the subsequent Appraisal wells.

10.3 Should any of the parties, referred to in Article 10.2, decide not to participate in the joint exploratory effort the interested parties wishing to participate may proceed to plan and drill the exploratory and Appraisal well on a sole risk basis. If the exploratory effort results in a discovery which the parties agree is Commercial Discovery, and the results require that unitization is required under Article 10.4, the parties who refused to participate in either the exploratory or Appraisal evaluation shall be required to refund directly to the party who took the sole risk with interest as per Article 11.8b, their full share of the costs of the exploratory and Appraisal wells on the date they indicate their intention to participate in the development of the field. Such payments shall not be reckoned as reimbursable expenses to the non-risking party or parties for the purpose of this Contract, however, the sole risk party shall be entitled to recover the total costs of such exploration and Appraisal wells.

10.4 If a Field discovered by CONTRACTOR extends into an area operated by a party, other than CONTRACTOR, under another service contract, or if another such party other than the CONTRACTOR discovers a fields which extends into the Contract Area, NNPC shall require all parties so involved to reach an agreement on a unitization programme so as to secure as far as is practicable minimum total expenditure and maximum oil recoveries and economic efficiency in the Appraisal, Development and production of the field to prevent waste of reservoir energy and

consequently prevent the loss of recoverable hydrocarbons. For this purpose, the entire field shall be treated as a single unit without regard to boundary limits of the contract area.

10.5 After reaching the said agreement the parties so involved shall jointly present the relevant Development plan to NNPC for approval.

10.6 Should the parties so involved fail to reach agreement on the details of the unitization plan, NNPC shall, in consultation with such parties, establish not only the basic Development plan, but also the equity percentage interests of such parties in financing and carrying out of the operations, and in the rewards therefrom.

10.7 If a Development plan and the CONTRACTOR's financial equity percentage interests are determined by NNPC as aforesaid, CONTRACTOR shall have the right, if it is not in total agreement with the plan, to appeal in writing to NNPC, against the deve1opment plan and/or the equity determination provided that such, appeal is made not later than three (3) months of its receipt by CONTRACTOR and that CONTRACTOR supports the appeal with a reasoned proposal for a justifiable improvement to the development plan and/or equity determination.

10.8 If any such notice is given by CONTRACTOR and if CONTRACTOR is unable to reach agreement with NNPC or with any of the other parties upon any of the amendments proposed then such amendments shall be referred to arbitration pursuant to Article 22 at the sole expense of the CONTRACTOR. Such arbitration expenses shall not be recoverable by the CONTRACTOR from the NNPC under any guise whatsoever.

J. RUSSIA

No documents.

K. UNITED KINGDOM

1. Petroleum (Production)(Landward Areas) Regulations, 1995 (PEPS)

Unit development

25.1 If at any time in which this licence is in force the Minister shall be satisfied that the strata in the licensed area or any part thereof form part of a single geological petroleum structure or petroleum field (hereinafter referred to as "an oil field") other parts whereof are formed by strata in areas in respect of which other licences granted in pursuance of the Act of 1934 or of that Act as applied by the Act of 1964 are then in force, and the Minister shall consider that it is in the national interest in order to secure the maximum ultimate recovery of petroleum and in order to avoid unnecessary competitive drilling that the oil field should be worked and developed as a unit in co-operation by all persons including the Licensee whose licences extend to or include any part thereof, the following provisions of this clause shall apply.

25.2 Upon being so required by notice in writing by the Minister, the Licensee shall co-operate with such other persons, being persons holding licences under the Act of 1934 or that Act as applied by the Act of 1964 in respect of any part or parts of the oil field (hereinafter referred to as "the other Licensees") as may be specified in the said notice, in the preparation of a scheme (hereinafter referred to as "a development scheme") for the working and development of the oil field as a unit by the Licensee and the other Licensees in co-operation, and shall, jointly with the other Licensees, submit such scheme for the approval of the Minister.

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

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

25.5 If the Licensee shall object to any such development scheme prepared by the Minister he may within 28 days from the date on which notice in writing of the said scheme shall have been given to him by the Minister refer the matter to arbitration in the manner provided by clause 39 of this licence.

2. Petroleum (Production) (Seaward Areas) Regulations, 1988 (PEPS)

Amendments:
The Petroleum (Production) (Seaward Areas) (Amendment) Regulations 1990
The Petroleum (Production) (Seaward Areas) (Amendment) Regulations 1995
The Petroleum (Production) (Seaward Areas) (Amendment) Regulations 1996

Unit development

28.1 If at any time in which this licence is in force the Minister shall be satisfied that the strata in the licensed area or any part thereof form part of a single geological petroleum structure or petroleum field (hereinafter referred to as "an oil field") other parts whereof are formed by strata in areas in respect of which other licences granted in pursuance of the Act of 1934 or of that Act as applied by the Act of 1964 are then in force and the Minister shall consider that it is in the national interest in order to secure the maximum ultimate recovery of petroleum and in order to avoid unnecessary competitive drilling that the oil field should be worked and developed as a unit in co-operation by all persons including the

Licensee whose licences extend to or include any part thereof the following provisions of this clause shall apply.

28.2 Upon being so required by notice in writing by the Minister the Licensee shall co-operate with such other persons, being persons holding licenses under the Act of 1934 or that Act as applied by the Act of 1964 in respect of any part or parts of the oil field (hereinafter referred to as "the other Licensees") as may be specified in the said notice in the preparation of a scheme (hereinafter referred to as "a development scheme") for the working and development of the oil field as a unit by the Licensee and the other Licensees in co-operation, and shall, jointly with the other Licensees, submit such scheme for the approval of the Minister.

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

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

28.5 If the Licensee shall object to any such development scheme prepared by the Minister he may within 28 days from the date on which notice in writing of the said scheme shall have been given to him by the Minister refer the matter to arbitration in the manner provided by clause 43 of this licence.

28.6 Any such development scheme or the award of any arbitrator in relation thereto shall have regard to any direction pursuant to clause 29 of this licence in force at the date of such scheme.

Directions as to oil fields across boundaries

29.1 Where the Minister is satisfied that any strata in the licensed area or any part thereof form part of an oil field, other parts whereof are in an area to which the Minister's powers to grant licences pursuant to the Act of 1934 or the Act of 1964 do not apply and the Minister is satisfied that it is expedient that the oil field should be worked and developed as a unit in co-operation by the Licensee and all other persons having an interest in any part of the oil field, the Minister may from time to time by notice in writing give to the Licensee such directions as the Minister may think fit, as to the manner in which the rights conferred by this licence shall be exercised.

29.2

The Licensee shall observe and perform all such requirements in relation to the licensed area as may be specified in any such direction.

29.3

Any such direction may add to, vary or revoke the provisions of a development scheme.

3. Petroleum (Current Model Clauses) Order, 1999 (PEPS)

Unit development

25. - (1) If at any time in which this licence is in force the Minister shall be satisfied that the strata in the licensed area or any part thereof form part of a single geological petroleum structure or petroleum field (hereinafter referred to as "an oil field") other parts whereof are formed by strata in areas in respect of which other licences granted in pursuance of -

a. the Act of 1934, or

b. that Act as applied by the Act of 1964, or

c. Part I of the Act of 1998,

are then in force and the Minister shall consider that it is in the national interest in order to secure the maximum ultimate recovery of petroleum and in order to avoid unnecessary competitive drilling that the oil field should be worked and developed as a unit in co-operation by all persons including the Licensee whose licences extend to or include any part thereof the following provisions of this clause shall apply.

(2) Upon being so required by notice in writing by the Minister the Licensee shall co-operate with such other persons, being persons holding licenses under -

a. the Act of 1934, or

b. that Act as applied by the Act of 1964, or

c. Part I of the Act of 1998,

in respect of any part or parts of the oil field (hereinafter referred to as "the other Licensees") as may be specified in the said notice in the preparation of a scheme (hereinafter referred to as "a development scheme") for the working and development of the oil field as a unit by the Licensee and the other Licensees in co-operation, and shall, jointly with the other Licensees, submit such scheme for the approval of the Minister.

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

(4) If a development scheme shall not be submitted to the Minister within the period so stated or if a development scheme so submitted shall not be approved by the Minister, the Minister may himself

prepare a development scheme which shall be fair and equitable to the Licensee and all other Licensees, and the Licensee shall perform and observe the terms and conditions thereof.

(5) If the Licensee shall object to any such development scheme prepared by the Minister he may within 28 days from the date on which notice in writing of the said scheme shall have been given to him by the Minister refer the matter to arbitration in the manner provided by clause 40 hereof.

(6) Any such development scheme or the award of any arbitrator in relation thereto shall have regard to any direction pursuant to clause 26 in force at the date of such scheme.

Sec. 26 Directions as to oil fields across boundaries

26. - (1) Where the Minister is satisfied that any strata in the licensed area or any part thereof form part of an oil field, other parts whereof are in an area to which the Minister's powers to grant licenses pursuant to Part I of the Act of 1998 do not apply and the Minister is satisfied that it is expedient that the oil field should be worked and developed as a unit in co-operation by the Licensee and all other persons having an interest in any part of the oil field, the Minister may from time to time by notice in writing give to the Licensee such directions as the Minister may think fit, as to the manner in which the rights conferred by this license shall be exercised.

(2) The Licensee shall observe and perform all such requirements in relation to the licensed area as may be specified in any such direction.

(3) Any such direction may add to, vary or revoke the provisions of a development scheme.

4. PRT Manual Inland Revenue—UK

6.4.1 The regulations governing the issue of production licenses by the Department of Trade and Industry are dealt with in detail at 2.1.1 et seq. Such licenses are issued to one or more participators and can cover one or more blocks. Under a production license participators have an exclusive right to search, bore for, and get oil within the licensed area. PRT field boundaries are determined by the Department of Trade and Industry purely on geological criteria. It can happen that a field can extend into two blocks, the blocks being under different ownership. Obviously it makes technical and commercial sense for the oil or gas field to be exploited jointly rather than as two separate developments under different operatorships. Even if the respective license holders cannot agree to a joint development the model clauses for production licenses give the Secretary of State power to require the licensees in both blocks to develop the field as one unit. As regards unitisations and the (b) definition of licensee at S12(1) OTA 1975 see 2.7.5.

As part of the legal framework to enable this to be done a unitisation agreement is drawn up in addition to the field operating agreement. Unitisations do not normally take place until each party has fully explored and appraised that part of the field which lies in his block i.e. normally at about the time the Annexe B (application to the Department of Trade and Industry for approval of the field development) is submitted. Under the unitisation agreement the licensees/participators in both blocks agree to commute their share of the production from that part of the field extending into their own block for a smaller share in the total production from both blocks. This overall share is calculated so as to give each participator the same estimated quantities of oil as if he had produced on his own from his own block and each participator's economic interest thus remains substantially what it was before unitisation took place. These production shares are calculated initially on the basis of the proven recoverable reserves of each block as at the date of the unitisation agreement. For example, if A has a 20% interest in licence area 1 in which a field extends into area 2 (where A has no interest) and the recoverable reserves of 1 are 300mbls and of 2 are

200mbls, A would be entitled to a 12% interest (20% x 300/(300+200)) In the unitised field with a share of the reserves amounting to 20% x 300 = 60 mbls or 12% x 500 = 60mbls.

5. DTI Oil & Gas Directorate - Regulation Guidance Notes

2.5.1 Unitisation and co-operative development

Where a Field Development Programme is proposed for a field which extends into the area covered by a neighbouring license operated by different company, commercial and technical disputes may arise with regard to the optimum development plan. The Department needs to be satisfied in such cases that the ultimate recovery of petroleum is maximised and that unnecessary competitive drilling is avoided. The most efficient way to satisfy these requirements and therefore avoid any possible delay in the approval process is for the Licensees to discuss their plans with their neighbours at an early stage and propose an agreed Field Development Programme. The proposal, which could be either a unitised development or other commercial arrangement, should allow an optimum Field Development Programme and demonstrate that there would be no risk of unnecessary competitive drilling. Where such agreement is not reached or the proposed Field Development Programme does not demonstrably satisfy these requirements, the Department will wish to understand the circumstances and give all parties adequate opportunity to make representations.

The Secretary of State has powers to require a unitisation between Licensees. The grounds for the use of this power are that unitisation is needed in the national interest both in order to secure the maximum ultimate recovery of petroleum and in order to avoid unnecessary competitive drilling.

Licensees should be aware that:

a. The Secretary of State will not necessarily refuse to grant development consent to a particular group of Licensees who have not concluded an agreement with the Licensees of an adjacent block on the basis that they have not concluded a unitisation agreement. The Department does not consider that powers to require unitisation extend to issues of fairness and equity between groups of Licensees. The Department's position is that proprietary rights do not exist in unextracted hydrocarbons under the UKCS and ownership of hydrocarbons arises only once they have been extracted under appropriate regulatory consent.

b. The Department's acceptance or rejection of any Field Development Programme will, therefore, be on the basis of whether or not it is an optimum development in terms of maximising the economic recovery of oil and gas. If, in any intended development, there is a likelihood of claims or disagreement between adjacent licence groups related to the field's extent, the Department should be consulted at an early stage.

In order for the Licensees to understand what constitutes a Field for both Unit Development and tax purposes, the Department will issue a proposed Field Determination (see Appendix 5) at an early stage in the Field Development Programme approval process, utilising the geological information that is available to it at that time.

L. YEMEN

1. Red Eagle Production Sharing Agreement Of 1992 Between The Ministry Of Oil And Mineral Resources And Red Eagle Resources Corp. (Ramah Block) (Barrows Supplement No. 125, M. East)

Article 11: Conservation, Prevention Of Loss, Environmental & Safety

11.1 The CONTRACTOR and the Operating Company shall take all proper measures, according to generally accepted methods in the Petroleum Industry to prevent loss or waste of Petroleum above or under the ground in any form during drilling, producing, gathering, transporting, distributing and storage operations. The MINISTRY has the right to prevent operation on any well that it might reasonably expect would result in loss or damage of the well or the Oil or Gas field.

11.2 Upon completion of the drilling of a productive well, the Operating Company shall inform the MINISTRY or its Representative of the time when the well will be tested and the production rate ascertained.

11.3 In instances where multiple producing reservoirs (not in pressure communication with each other) in the same well can only produce economically through a single tubing string, Petroleum shall not be produced from multiple Petroleum bearing zones through one string of tubing at the same time, except and when prior approval of the MINISTRY or its representative has been obtained.

11.4 The Operating Company shall record data regarding the quantities of Petroleum and water produced monthly from each Development Area. Such data shall be sent to the MINISTRY or its Representative on the special forms provided for that purpose. A report to that effect must be submitted daily. Daily or weekly statistics regarding the production from the Development Area shall

be available at all reasonable times for examination by authorized representatives of the MINISTRY.

11.5 Daily drilling records and the graphic well logs must show the quantity and type of cement and the amount of any other materials used in the well for the purpose of protecting Petroleum, Gas bearing or fresh water strata.

Any fundamental change in the mechanical operation on a well after its completion, must be approved by Representative of the MINISTRY.

11.6 In the course of performing the Petroleum Operations, the CONTRACTOR shall abide by the laws, decrees, other rules and regulations with respect to environmental protection and safety of the country and conduct its operations in accordance with accepted Petroleum Industry practices.

VIII. APPENDIX II

REDETERMINATION EXAMPLE

Assume that two tracts, tract 1 and tract 2, have formed a unit with tract interests of 30% and 70%, respectively. Based upon these tract interests, the initial unit interests of the parties to the two tracts were calculated as follows:

TRACT	PARTY	LICENSE AGREEMENT	INITIAL TRACT PARTICIPATION	INITIAL UNIT INTEREST
1	A	10	30	3
	B	40	30	12
	C	50	30	15
2	D	30	70	21
	E	30	70	21
	F	40	70	28

Prior to redetermination, 1,000,000 barrels of crude oil are produced for the account of the parties (*i.e.*, after deduction of the host government's share) and distributed among the parties in proportion to their unit interests. Expenditures borne by the parties in proportion to their unit interests prior to redetermination total $20,000,000. A redetermination process then results in the establishment of revised tract interests of 35% for Tract 1 and 65% for Tract 2. As a result, revised unit interests would be calculated as follows:

TRACT	PARTY	LICENSE AGREEMENT	REVISED TRACT PARTICIPATION	REVISED UNIT INTEREST	Δ (%) INCREASE OR DECREASE
1	A	10	35	3.5	0.5
	B	40	35	14.0	2.0
	C	50	35	17.5	2.5
2	D	30	65	19.5	(1.5)
	E	30	65	19.5	(1.5)
	F	40	65	26.0	(2.0)

The revised unit interests will apply from the effective date of the redetermination forward; however, additional adjustments are necessary to bring past production and past costs in line with the revised unit interests.

The Adjustment Quantity that the parties to the Increased Tract (Tract 1) receive (and that the parties to the Reduced Tract (Tract 2) will relinquish) to make up for past underproduction of the Increased Tract is determined as follows:

TRACT	PARTY	Δ (%)	PRODUCTION PRIOR TO REDETERMINATION (BBLs)	ADJUSTMENT QUANTITY (BBLs)
1	A	0.5	1,000,000	5,000
	B	2.0	1,000,000	20,000
	C	2.5	1,000,000	25,000
2	D	(1.5)	1,000,000	(15,000)
	E	(1.5)	1,000,000	(15,000)
	F	(2.0)	1,000,000	(20,000)

The Increased Tract parties will receive the Adjustment Quantity out of the share that would otherwise go to the Reduced Tract

parties according to a schedule established by the unitization agreement.

The cost adjustment that the parties to the Increased Tract must pay to the parties to the Reduced Tract to make up for past underpayment of costs by the Increased Tract is determined as follows:

TRACT	PARTY	Δ (%)	COSTS PRIOR TO REDETERMINATION ($)	COST ADJUSTMENT ($)
1	A	0.5	20,000,000	100,000
	B	2.0	20,000,000	400,000
	C	2.5	20,000,000	500,000
2	D	(1.5)	20,000,000	(300,000)
	E	(1.5)	20,000,000	(300,000)
	F	(2.0)	20,000,000	(400,000)

The Increased Tract parties will pay the cost adjustment to the Reduced Tract parties in cash according to the schedule established by the unitization agreement. Note that if the unitization agreement requires an immediate payment of the cost adjustment, as is often the case, the Increased Tract parties may find themselves to be temporary losers in the redetermination process. Party C, for example, will receive 25,000 barrels of additional production worth perhaps $1 million over several years, but will need to pay $500,000 in costs immediately, resulting in an initial cash deficit that might only be erased after one to two years of the Adjustment Quantity have been received.