

# UNITIZING OIL AND GAS FIELDS AROUND THE WORLD: A COMPARATIVE ANALYSIS OF NATIONAL LAWS AND PRIVATE CONTRACTS<sup>1</sup>

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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.<sup>2</sup> 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 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

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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.*

“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.<sup>3</sup> 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.<sup>4</sup> 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,<sup>5</sup> the contracts awarded often cover large areas comprised of many thousands of acres.<sup>6</sup> 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.<sup>7</sup>

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

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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).

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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.<sup>8</sup> 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.<sup>9</sup> 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,<sup>10</sup> licensees have moved into areas with undefined boundaries contested by rival coastal 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

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8. Sandoval Amui & Marianne 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).

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<sup>11</sup> 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.

### *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

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

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.<sup>12</sup>

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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 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,

## 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.*<sup>13</sup>

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

- 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.

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ep.api.org/issues/index.cfm?bitmask=002006002  
004000000 (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 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.<sup>14</sup>

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.<sup>15</sup> 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 of oil or gas as the field is abandoned sooner because it is not commercially profitable in its later stages.<sup>16</sup> Both economic and physical waste have direct economic impacts on the country owning the resource, in the form of lower revenues from

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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).

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.

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.*<sup>17</sup>

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

*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.*<sup>19</sup>

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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.

19. See, e.g., *Venezuela, Trinidad & Tobago to Unitize Joint Gas Fields*, OIL &

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

- Cross-border unitization is only required once a discovery is made.<sup>21</sup>
- 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 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.<sup>22</sup>

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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).

22. *See generally* William T. Onorato, *Joint Development of Seabed Hydrocarbon*

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*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.*<sup>23</sup>

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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*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).<sup>24</sup>

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.<sup>25</sup>

### *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.<sup>26</sup> 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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<sup>24</sup> See Smith, *supra* note 6, at 312–21.

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

<sup>26</sup> 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.<sup>27</sup> 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,<sup>28</sup> 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.<sup>29</sup>

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.<sup>30</sup>

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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

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<sup>31</sup> (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).<sup>32</sup> 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.<sup>33</sup>

On onshore federal lands in the United States, early unitization is sometimes practiced through laws authorizing the

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increase rather than restrict production. For other benefits of securing commission 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.

formation of federal exploratory units.<sup>34</sup> Strong arguments have 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.<sup>35</sup>

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.<sup>36</sup> However, the proponents of unitization must first secure voluntary agreement of a supermajority of interests (both royalty and working interests) before resort to

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

compulsory process. In some instances, the states have such high required percentages for voluntary agreement that unitization is still an arduous, if not impossible, task.<sup>37</sup>

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.<sup>38</sup> 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.<sup>39</sup>

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,

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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.

regardless of where the wells are located. Thus, if a tract 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.<sup>40</sup>

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,<sup>41</sup> 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<sup>42</sup> 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<sup>43</sup> continue to apply on a block basis.<sup>44</sup>

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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)

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:<sup>45</sup>

- (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.<sup>46</sup>

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.<sup>47</sup>

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-

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(discussing unitization's effects on typical agreements).

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).

producing states of the United States provides considerable comparative experience (unfortunately, often as the end result of litigation) about the meaning of the terms and provisions found in other countries' laws.<sup>48</sup> 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.<sup>49</sup>

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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

- 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.<sup>50</sup> 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.

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Yemen require legislative approval of the actual production sharing agreement, although 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.)

- Four additional countries—Egypt, Indonesia, Nigeria and the United Kingdom—have regulations governing 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.<sup>51</sup> 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

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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.

ground in any form . . . .”<sup>52</sup> Such a provision can be interpreted to 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.<sup>53</sup> Such a conservation provision is probably quite common in the international petroleum framework.<sup>54</sup>

- In three countries—Azerbaijan, Egypt, and Nigeria—the search of Barrows’ source material found unitization provisions in signed development contracts, such as

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

licenses or production sharing agreements. The actual

contract provisions add little detail to the legal provisions already extant in these countries.<sup>55</sup>

- 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.<sup>56</sup>

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<sup>57</sup>

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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.<sup>58</sup>

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.<sup>59</sup> 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

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

<sup>59</sup> 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).

broad. The first trigger to compulsory unitization is the 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.<sup>60</sup>

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.<sup>61</sup>

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.<sup>62</sup> 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.

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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.<sup>63</sup>

(*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.<sup>64</sup> 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.<sup>65</sup>

**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.<sup>66</sup>

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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 (5<sup>th</sup> 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.<sup>67</sup> 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.<sup>68</sup>

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,<sup>69</sup> "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.<sup>70</sup>

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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."<sup>71</sup> 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.<sup>72</sup>

**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.<sup>73</sup> 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.<sup>74</sup> 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.<sup>75</sup> 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.<sup>76</sup>

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.”<sup>77</sup> 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,<sup>78</sup> most state conservation commissions cannot order unitization solely for the purpose of protecting correlative rights.<sup>79</sup> 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

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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).

the pie) in cases when the conservation commission must choose between the two purposes.<sup>80</sup>

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.<sup>81</sup> 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."<sup>82</sup> The U.K. Petroleum Regulations are similar: Unitization is authorized if it is in the national interest "to

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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].

secure the maximum ultimate recovery of petroleum and in order to avoid unnecessary competitive drilling.”<sup>83</sup>

**Ecuador:** Ecuador’s 2002 Petroleum Regulations authorize unitization to “improve the efficiency and economy of the operation.”<sup>84</sup>

#### *F. Oil versus Gas*

In the United States, unitization statutes are often limited to oil fields or to certain types of gas operations.<sup>85</sup> A major reason

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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

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.<sup>86</sup> Secondly, in nonassociated gas fields, the basic displacement mechanism is simple expansion of the gas when pressure is released at one or more wells.<sup>87</sup> 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.<sup>88</sup> 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.<sup>89</sup> 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.<sup>90</sup> Indeed, politicians rather like the jobs created by drilling unnecessary wells.<sup>91</sup>

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

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passed 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.

is much more efficient than if each operator constructed a separate plant.<sup>92</sup> 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.<sup>93</sup> Yet, joint marketing of gas can enable producers to negotiate better terms with buyers, which in turn can result in higher recoveries of gas.<sup>94</sup> Further, joint marketing of gas in the United States can solve the thorny problem of protecting correlative rights in gas fields where

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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.*

different lessees/licensees have different access to marketing 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.<sup>95</sup> Note, however, that even if antitrust objections to joint marketing are overcome, there still may be tax effects.<sup>96</sup>

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

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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.

can be determined.

**Angola** (*1997 Model Production Sharing Agreement & 1997 Standard Concession Decree Law*): Article 27 of the Model PSA provides for the unitization of petroleum deposits.<sup>97</sup> 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.<sup>98</sup>

**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.<sup>99</sup>

**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.<sup>100</sup>

**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

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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 naphtha, 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.).

with one or more producing reservoirs, or in which the capacity to produce hydrocarbons in commercial quantities has been proven.<sup>101</sup> The word “hydrocarbons” is defined as including both liquid and gaseous hydrocarbons.<sup>102</sup>

**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.<sup>103</sup>

(*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.<sup>104</sup>

**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.<sup>105</sup> The model contracts refer to both oil and gas.<sup>106</sup>

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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.”<sup>107</sup> 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.<sup>108</sup>

**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.<sup>109</sup>

#### *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.<sup>110</sup> Sometimes, the particular definition chosen significantly affects the authority of the conservation commissions in the United States to regulate for certain purposes.<sup>111</sup> Outside of the United States, few provisions in this survey expressly differentiate between pools, strata, reservoirs, and fields.<sup>112</sup> 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.<sup>113</sup>

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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.<sup>114</sup>

*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.<sup>115</sup> 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.<sup>116</sup> 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.<sup>117</sup> In all cases, however, the ultimate result must be fair and reasonable to the owners.<sup>118</sup>

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:<sup>119</sup>

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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

**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.”<sup>120</sup>

**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.”<sup>121</sup> Brazil’s Model Concession Agreement must “equitably contemplate the rights and obligations of the [c]oncessionaires.”<sup>122</sup>

**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.<sup>123</sup> However, Ecuador’s Model Unit Agreement is very specific regarding how shares of the parties are to be determined.<sup>124</sup> 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

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mechanisms . . . and others.” Al Boulos lists stock tank oil originally in place, movable oil 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 (5<sup>th</sup> 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).

the size of the reservoir's reserves and on the price of crude oil; 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.<sup>125</sup> In the United Kingdom, the U.K. Department of Trade and Industry (DTI) offers guidance notes of interest.<sup>126</sup> 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.<sup>127</sup> 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.<sup>128</sup>

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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.

These notes clearly indicate that the national interest lies in 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.<sup>129</sup> 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

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

amounts in the respective concession contract for each contractor.<sup>130</sup>

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

(*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."<sup>132</sup>

(*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"<sup>133</sup> 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."<sup>134</sup> 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"<sup>135</sup> 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 (5<sup>th</sup> 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.<sup>136</sup> Under Clause 12, taxes and other items shall be paid "in accordance with . . . the Participation Agreement."<sup>137</sup> As a catchall, Clause 17 states that "the terms and conditions of the Participation Agreement shall apply in everything not expressly provided otherwise"<sup>138</sup> 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.<sup>139</sup>

*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.<sup>140</sup> 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

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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.

that they should agree to unitize.<sup>141</sup>

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.”<sup>142</sup> 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.<sup>143</sup>

**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.<sup>144</sup> If ANP does not approve the agreement proposed by the parties, development and production may be suspended.<sup>145</sup> 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.<sup>146</sup>

**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

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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 (5<sup>th</sup> ANP Round), cl. 12.2.2 (2003) (Braz.) (PEPS).

145. *Id.*

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

can be reached by the parties.<sup>147</sup> However, the provisional agreement cannot extend past 180 days and must still have Ministry of Energy and Mines approval.<sup>148</sup> 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.<sup>149</sup> 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.<sup>150</sup>

**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.<sup>151</sup>

**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”<sup>152</sup> 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.<sup>153</sup>

**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.<sup>154</sup> 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.<sup>155</sup> 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.<sup>156</sup> 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.<sup>157</sup>

**Brazil:** The National Petroleum Agency (Agência Nacional do Petróleo, or ANP) is the licensing authority in Brazil with authority to approve unitization.<sup>158</sup>

**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.<sup>159</sup>

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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](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.<sup>160</sup> 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).<sup>161</sup> 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.<sup>162</sup> 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.<sup>163</sup>

**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

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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 Nacional de Hidrocarburos – ANH Homepage, Historia, [http://www.anh.gov.co/html/i\\_portals/index.php](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 Nacional de Hidrocarburos – ANH Homepage, [http://www.anh.gov.co/html/i\\_portals/index.php](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).

Petroleum.

The agreements require ratification by the People's Assembly to become effective.<sup>164</sup>

**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.<sup>165</sup>

**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.<sup>166</sup>

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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).<sup>167</sup> There is no requirement for DTI approval of a unitization agreement as such, only for an agreed and optimum “Field Development Programme.”<sup>168</sup>

**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.<sup>169</sup>

### *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.<sup>170</sup> (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.<sup>171</sup>

**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;

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171. *Infra* Appendix I, Model Concession Agreement (5<sup>th</sup> 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.<sup>172</sup>

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”).<sup>173</sup> 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.

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

<sup>173</sup> *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.<sup>174</sup> 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.<sup>175</sup>

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."<sup>176</sup> 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.<sup>177</sup> 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.<sup>178</sup>

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

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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].

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unitization in order to allow the unitization agreement to control operations in the unitized field. Where the unitization only covers certain substances<sup>179</sup> or certain depths,<sup>180</sup> 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.<sup>181</sup>

## 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.<sup>182</sup>

....

... 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.<sup>183</sup>

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 costs and home-office overhead costs to the other

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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.

participants.<sup>184</sup> 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.<sup>185</sup> 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<sup>186</sup> or the host government dictates the terms of the unitization.<sup>187</sup>

### 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.<sup>188</sup> 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.<sup>189</sup>

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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.<sup>190</sup> 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.<sup>191</sup>

In typical cases where the applicable host-government contract or laws allow the government to compel each participant to unitize,<sup>192</sup> 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.<sup>193</sup> 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.<sup>194</sup> 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,<sup>195</sup> so it will likely be unclear

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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

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.<sup>196</sup> 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.<sup>197</sup> 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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Gas from the \_\_\_\_ Block 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.<sup>198</sup>

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<sup>198</sup> 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.<sup>199</sup> 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.<sup>200</sup>

Although there are a number of model forms of unitization agreements that have been prepared for use in certain countries or certain situations,<sup>201</sup> no model has been prepared for general international use.<sup>202</sup> A “model” unitization

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

200. Compare, e.g., *infra* Appendix I, Model Concession Agreement (5<sup>th</sup> 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>.

agreement for 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

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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.<sup>203</sup>

#### 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.<sup>204</sup> A unit area may

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

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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.<sup>205</sup>

## 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

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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.

the 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

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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.<sup>206</sup> 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

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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).

lessees.<sup>207</sup>

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 17–20° 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

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

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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.<sup>208</sup>

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,<sup>209</sup> 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

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

209. See *infra* subpart V.H.

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, 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<sup>210</sup> 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

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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).

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 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.<sup>211</sup> 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.<sup>212</sup> 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.

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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.

## 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 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:

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

Unit interests will generally change only upon a change in tract interests<sup>213</sup> 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

213 See *infra* subpart V.F.

interest arrangements or for other purposes, provided that the total of the interests equaled the agreed tract interest for the tract.

### *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.<sup>214</sup> 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.<sup>215</sup> 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.<sup>216</sup> 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.<sup>217</sup>

### 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.<sup>218</sup>

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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<sup>219</sup> and because the smaller gains in accuracy obtained from additional data after the first several years of production may not justify the cost.<sup>220</sup>

#### 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.<sup>221</sup>

In addition to requiring disclosure of data, unit parties sometimes desire to restrict the data which are used for purposes of redetermination,<sup>222</sup> perhaps from a desire to control a third-party decisionmaker<sup>223</sup> 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.<sup>224</sup>

##### 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

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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).

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unitization 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.<sup>225</sup> 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

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<sup>225</sup> 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.

Owners do not agree on redetermined HPV values by 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.<sup>226</sup>

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.<sup>227</sup>

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.<sup>228</sup> 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

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.<sup>229</sup> 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.<sup>230</sup>

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.<sup>231</sup>

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WL 20283 (Del. Ch. Aug. 3, 1983).

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

### 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.<sup>232</sup> 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

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process and seeks to resolve each dispute as it arises. See 1 TERENCE DAINIITH ET AL., 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.

in the international petroleum industry to attempt to reallocate income, rather than hydrocarbons, following redetermination.<sup>233</sup> 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.<sup>234</sup> 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.<sup>235</sup>

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

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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.

arrangement between them. If the redetermination results in a change in the past costs attributable to the carried interest,<sup>236</sup> 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.<sup>237</sup> Under either

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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

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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.<sup>238</sup> It is unlikely that the host government will agree to retroactive adjustments of royalties,

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payment after twelve months; and two could not be analyzed as a result of insufficient 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.

taxes, cost recovery, and production sharing based on retroactive 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.<sup>239</sup>

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.<sup>240</sup> 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

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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 DAINITH, *supra* note 231, § 1-744.

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decisionmaking across blocks possible.<sup>241</sup> 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.<sup>242</sup>

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.”<sup>243</sup>

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<sup>242</sup> See, e.g., *supra* note 215.

<sup>243</sup> Eckman, *supra* note 48, at 381.

