Originaly, a party who owned property was deemed to own the property to the center of the earth. However, with the onset of mining developments, all jurisdictions have clearly established that the surface of the land may be separated from the different strata beneath it, and that there may be as many different owners as there are strata.\(^{(1)}\)

Once an underground strata is severed, courts have recognized the right of the owner of the severed strata to pass through overlying strata to extract the minerals, including oil and gas.\(^{(2)}\)

The horizontal division of oil and gas leaseholds creates a myriad of rights, duties, and obligations between the oil and gas lessor and each leasehold owner of severed strata, and among the leasehold owners of the severed strata. These rights, duties and obligations will be the principal focus of this Chapter.\(^{(3)}\)
Ownership of different strata of oil and gas, in fee and by leasehold, may be severed as follows:

1. Severance by owner of fee title by conveyance, exception and reservation;
2. Sublease or farmout agreement by leasehold owner to a third-party operator;
3. Assignment by leasehold owner;
4. Execution of separate leases by oil and gas owner to individual lessees covering different strata;
5. Order of state conservation commissions;
6. Expiration or termination of lease as to certain strata due to express lease provisions or to breach of implied covenant of further development;
7. Operation of Pugh Clause in the oil and gas lease;
8. Partial release of strata by oil and gas lessee; and
9. Condemnation of strata for storage.

§ 10.03. Effect on Oil and Gas Lease Terms.


The Habendum Clause of an oil and gas lease is also referred to as the Term Clause. It generally provides for a fixed primary term followed by a secondary term that maintains the lease in effect so long as oil or gas is produced. The lease will continue in effect after the primary term so long as the lessee has established and continues production. Continuing lease rights include the right to explore, develop, and exploit all other formations underlying the leased premises unless the right to do so is expressly limited by the lease.

The right to explore, develop and exploit other formations may be terminated in the event of a breach of the implied covenant of further development, set forth later in this Chapter. Upon termination of production on the leased premises, the leasehold interest ends unless extended by some type of savings clause. A typical savings clause would be a continuous operations clause providing: "If production from the leased premises should cease, this lease shall not terminate if lessee commences operations for additional drilling or reworking within 90 days thereafter."

In the Louisiana case of *Harry Bourg Corp. v. Union Producing Co.*, production from a deep well terminated. The lessee plugged back the well and completed it as a producing well at a shallower depth. Although the lease contained a continuous operations clause similar to that cited above, the lessor claimed that the lease had ended and that plugging back the well did not constitute "reworking" since "reworking" contemplates work done on the well in the original producing formation. The court held that the lessee had extended the leasehold interest by reworking the well through the plugging back recompletion operation.

It should be noted that some continuous operation clauses provide only for the commencement of "drilling operations" and may not include "reworking." This type of continuous operations clause may not be sufficient to extend a leasehold by plugging back to a shallower horizon, either by the same lessee or a third
party holding shallow rights in the leasehold.


The typical delay rental clause will require the payment of an annual or quarterly rental to maintain the leasehold in effect during the primary term. While the rental may be phrased in terms of dollars per acre, it is almost never based on the number of formations. In the event of severance of leasehold interests in different formations, the delay rental must be paid by one or more of the leasehold owners to maintain the lease. Consequently, the documentation for any horizontal division of the leasehold should address the responsibility for payment of delay rentals and the manner in which assurance thereof is provided to the other leasehold owners.


The typical royalty clause will provide for payment of a 1/8th or more royalty on the production of oil and gas. (7)

In the event of a horizontal division by the leasehold owners, each party will be liable for royalty on production from the strata it operates. However, if there is a horizontal division of the lessors' interest, problems may arise as to how to account for royalties to each lessor in dual completion wells — wells completed and producing from separate formations.


A shut-in royalty clause (8) provides that if production ceases while the well is still capable of production, the lease may be maintained by payment of a shut-in royalty. Should the leasehold be divided into different strata, the production by the leasehold owner of an individual stratum would maintain the lease. If such well were shut in, the payments of shut-in royalty would operate to maintain the lease. While it's logical that the shut-in royalty should be paid by the leasehold owner of the horizon where the shut-in well is located, the leasehold owners of other horizons may be dependent upon the payment of the shut-in royalty to maintain their leasehold interest; therefore, payment of the shut-in royalty should be assured.

As an example, assume that A is the lessee under an oil and gas lease covering all strata. Further assume that A assigns all leasehold rights in the Medina Sands to B. B proceeds to drill and operate a well, producing from the Medina Sands, which maintains the lease in effect beyond the primary term as to all strata. Should B shut in the producing well, the lease would require shut-in royalty payments to keep the lease in effect. The shut-in royalties should be paid by B and A should verify payment of the shut-in royalty.


Unitization of the leased premises may be limited to certain formations either by the unitization clause in the lease or by the declaration of unit executed by the leasehold owner of the horizon.


Occasionally, lessors will add a Pugh clause to the unitization clause of an oil and gas lease. Typically, the Pugh clause provides that the lease term will be extended beyond the primary term by unitized operations on the leased premises and other properties only as to as much of the leased premises as are included in the unit. The lease will terminate at the expiration of the primary term as to any portion of the leased premises not included in the unit.
The effect of a Pugh clause on a lease unitized as to a single stratum is illustrated in two cases, wherein each court interpreted the identical Pugh clause with different results.

In Rogers v. Westhoma Oil Co.,\(^9\)

Westhoma was the leasehold owner of all horizons below sea level. Plains Natural Gas Co. was the owner of all horizons above sea level. Plains unitized "all producing horizons which are situated above and down to, but not below, the sea level."\(^{10}\)

Plains secured production from the above-sea-level horizons in the consolidated unit. The leases contained a Pugh clause providing that the lease would terminate at the expiration of the primary term as to any "tract or tracts not included in a consolidation held in force by production" unless there was production under lease provisions. Plaintiffs sought an order terminating the leases as to all oil and gas below sea level, claiming that the horizons below sea level constituted a tract or tracts not included in a consolidation. Westhoma argued that the leases remained in effect as to all horizons and that the Pugh Clause only applied to vertical divisions of the leased premises, not to horizontal divisions. In support of this position, Westhoma argued that the unitization clause provided for payment of royalties according to surface acreage within the unit, that delay rentals were computed based on surface acres, and that horizontal strata would not commonly be referred to as "tracts."

The Tenth Circuit ruled that its primary duty was to construe and interpret the intent of the parties:

The Pugh clauses are for the protection of the lessors to prevent lease continuation as to unitized portions which are non-producing. We find nothing in the leases which confines the application of the Pugh clauses to surface areas and vertical divisions. It is common knowledge that leases are divided both vertically and horizontally and that unitization is ordinarily on the basis of a common source of supply. While the inclusion of all surface areas in consolidations protects lessors from the hardships resulting, in the absence of a Pugh clause, from partial vertical consolidation, recognition of this fact does not solve the problem. A lease can provide for protection against continuation both of unconsolidated vertical divisions and of unconsolidated horizontal divisions. Considering these leases as a whole, we believe that a reasonable interpretation requires the conclusion that it was the intent of the parties to prohibit lease continuation as to unproductive portions without a consolidation whether such portions were the result of horizontal or vertical divisions. As the below sea level horizons were not included within any consolidations and as there was no production therefrom, the lease is terminated as to such horizons at the end of the primary period.\(^{11}\)

The Supreme Court of Oklahoma construed the identical lease provision in Rist v. Westhoma Oil Co.\(^{12}\)

Here, Westhoma was the leasehold owner of all horizons below sea level while other lessees became the owners of the leasehold estate above sea level. As in Rogers, the strata above the sea level had been unitized. While there was production from the unitized strata, there was no production from the horizons below sea level. Plaintiffs sought to terminate Westhoma's leasehold interest in the strata below sea level based on the same Pugh clause discussed in the Rogers case.

In construing the Pugh clause in favor of Westhoma, the court stated:

There is nowhere contained any language that purports to recognize or show intention that these terms are to apply or even recognize other than the customary application of vertical severance. Certainly the parties could have made reference to partial consolidation of separate horizontal structures by appropriate terms, but they say nothing as to depths, levels or strata.\(^{13}\)
The court went on to say "The words 'tract or tracts,' 'premises,' 'lands,' and 'leasehold estates' do not import in our minds other than their common meaning." (14)

The court concluded that it seemed clear that the parties entered into a lease agreement for a primary term of 10 years with the term to be extended on production from the area described or from unit production of the area with no thought in mind of a severance as to horizontal divisions. (15)

Therefore, the Oklahoma Supreme Court denied plaintiffs' request to apply the Pugh clause to the horizons below sea level.

§ 10.04. Effect of Horizontal Division on the Implied Covenant of Further Development.

Implied covenants generally impose a duty between parties based on determinations of what constitutes fair and reasonable dealings between them. The implied covenant of further development is an implementation of the general intention of the parties to develop the leased premises for their mutual advantage. (16)

While the express terms of the oil and gas lease provide that the lease will be maintained in effect beyond the primary term based on production of oil and gas, the implied covenant of further development may be imposed to create an obligation in the lessee to develop additional portions of the leased premises. These additional portions could be vertical or horizontal portions of the leasehold.

The implied covenant of further development, resulting from a horizontal division of a leasehold, was considered by the Supreme Court of Arkansas in Reynolds v. Smith. (17)

The lease in question was fully developed as to all known horizons from the surface to a depth of 3,500 feet. The lessors requested additional drilling of the deeper formations but were refused by the leasehold owner of these formations. The lessors then sought termination of the lease as to the deeper formations based on a breach of the implied covenant of further development. The Arkansas Supreme Court rejected the lessors' argument, stating:

The question is what would be reasonably expected of an operator of ordinary prudence, having regard to the interest of both lessors and lessees. The lessees cannot act arbitrarily. They must use sound judgment and must deal with the leased premises (in regards to the deeper formations and in all other respects) so as to promote the interests of both parties. (18)

Testimony indicated that a prudent operator would not drill wells to deeper formations in the area of the lease without sufficient acreage to protect the operator's financial investment required to drill a deep test well. The court further stated that, although lessors claimed they could sell a lease on the deep rights, there was no proof that other operators would be willing to drill to deeper formations on the lease. The court refused to find that the implied covenant of further development was breached; however, it did state:

If any time in the future, in the opinion of the plaintiffs, the wells are not producing oil in paying quantities, or if they are able to produce testimony to show that a reasonably prudent operator would be justified in making the expenditure of money necessary for a deep test, plaintiffs may make demand on the defendants to do so and in the event of the failure of the defendants to take such action, then the plaintiffs will be at liberty to take such action as may be necessary to protect their interest. (19)

The implied covenant of further development was also considered by the Supreme Court of Oklahoma in Shell Oil Co. v. Lee. (20)
Shell was the owner of deep rights on the lease in question. The shallow rights had been developed by a third party under a farmout agreement from Shell. The lessors, through their attorneys, requested Shell to drill a deep test well. When Shell refused, the lessors sued for termination of the deep rights on the basis of a breach of the implied covenant of further development. The trial court ruled in favor of the lessors, ordering the lease cancelled as to the deep rights unless Shell commenced another well to a depth of 6,500 feet on the lease within six months from the judgment. On appeal, the Oklahoma Supreme Court reversed, determining that Shell had acted as a prudent operator. The testimony at trial indicated that Shell had committed itself to drill a deep test a quarter of a mile from the subject lease and wanted to see what was discovered there before drilling a similar well on the lessors' land. The court further stated:

It is a matter of more or less common knowledge in oil producing sections of this country that practicable or feasible arrangements for such development, especially in the instance of exploration of a newly discovered deep structure or exploration in a 'wildcat' area, often require much time; and what is a 'reasonable' or 'unreasonable' time for lessee to delay further drilling in a particular case must depend on the facts established therein. (21)

The court concluded that plaintiffs had wholly failed to discharge their burden of showing cause for the extraordinary relief of cancellation and, consequently, remanded the case to the trial court with directions to set its order aside and render judgment for the defendants.

As these two cases show, the standard for determining whether the implied duty to engage in further development of separate strata has been breached is whether a prudent operator would develop that strata. It is submitted that, where there is a horizontal division of a leasehold, courts may be more likely to impose the implied covenant of further development. Where there is no horizontal division, the lessee has invested in the development of at least one or more strata of the leased premises. However, where there has been a horizontal division, the leasehold owner of the undeveloped strata has not conducted any activities for the benefit of the lessor. Consequently, courts may be more prone to impose the implied covenant of further development on such a leasehold owner.

§ 10.05. Identification of Strata.

In Carter Oil Co. v. McCasland, (22)

Carter assigned to McCasland its rights in leases "insofar as said leases cover producing horizons above the depth of 4,000 feet." The assignments reserved to Carter all interest in the tracts "insofar as they cover producing horizons below the depth of 4,000 feet." (23)

McCasland drilled a well to the Woods Sand zone producing formation. Additional wells were then drilled into the formation by McCasland and by Carter. The formation was a slanting formation, dipping 58 to 60 degrees. In some locations the zone was encountered above 4,000 feet while in other areas it was found below 4,000 feet. The controversy in this case was based on Carter's claim that it had the right to drill into the Woods Sand formation anywhere on the assigned acreage at any location where that formation was encountered at a depth of more than 4,000 feet. McCasland claimed the sole right to produce from the Woods Sand zone formation. The trial court ruled in favor of McCasland, based on a finding that there was never any contemplation by the parties that each would produce oil or gas from the same common pool. The court concluded, as a matter of law, that the phrase "insofar as they cover producing horizons above the depth of 4,000 feet" should be construed as meaning "insofar as they cover, embrace and include producing horizons encountered above 4,000 feet." (24)
Based on its findings and conclusion of law, the court entered judgment for McCasland. McCasland was entitled to produce all of the oil and gas contained in the Woods Sand zone producing horizon underlying the lands in question from wells drilled or to be drilled by McCasland to a depth of not more than 4,000 feet. In addition, the court found Carter guilty of conversion in producing oil and gas from that sand by wells it had drilled to depths below 4,000 feet.\(^{(25)}\)

In *Nation Oil Co. v. R. C. Davoust Co.*,\(^{(26)}\) the court construed the effect of an assignment which reserved "all their leasehold rights as to formations below the base of the McClosky lime, together with Well No. 5-B thereon and the equipment of such well except the tank battery." Well No. 5-B was producing oil from horizons below the McClosky lime, but was also producing oil from a formation above the McClosky lime. Davoust contended that Nation was restricted to pumping oil from formations below the McClosky lime and was not permitted to pump oil from any formations above it. Nation contended that the reservation included that part of the lease below the McClosky lime in addition to the right to produce from Well No. 5-B at any depth. Davoust claimed that a "well" was only a hole in the ground drilled to obtain oil while Nation contended that the term "well" includes more than just the hole in the ground.

The court sided with Nation and held that the word "well," as used in the agreement between the parties, meant, not only the hole in the ground, but the casing and all the equipment above and below the ground that made it an oil well. By implication, the court ruled that Nation had retained the right to operate the well from all depths.

In *Kidwell v. General Petroleum Corp.*,\(^{(27)}\) the plaintiffs leased certain oil lands to General Petroleum. The lease provided that (1) the lessee would "continue the work of drilling such well after commencing the same with due diligence until a depth of 3,500 feet has been reached unless oil is discovered in paying quantities at a lesser depth" and (2) "all wells subsequent to the first well shall likewise be drilled with due diligence until a depth of 3,500 feet has been reached, unless oil is discovered in paying quantities at a lesser depth."\(^{(28)}\)

The defendant drilled wells to a depth greater than 3,500 feet, and plaintiff filed suit, claiming that the lease covered only oil and gas to a depth of 3,500 feet and that the lessor was not authorized to conduct operations at a greater depth. The court ruled that the language referring to a depth of 3,500 feet was intended to impose a minimum drilling obligation, not to limit drilling below that depth. The court stated that the plaintiffs, if they had actually intended to restrict drilling to 3,500 feet, failed to state their purpose clearly, and thereby opened the gate for the lessee to drill to whatever level it pleased.

In *Waldrip v. Hamon*,\(^{(29)}\) Waldrip executed a lease to Hamon which was made subject to an agreement that [If a second well was not drilled] to the Humphreys sand or deeper, then Hamon will, if Waldrip can show that he has a bona fide offer from a third party to drill such a well to the Humphreys sand, release said oil and gas lease. . . and such release shall be to the Humphreys sand only. In lieu of said release and upon Waldrip's request, Hamon will assign his interest in the lease covering said part of lease acreage to any person that Waldrip might get to drill a well thereon.\(^{(30)}\)

A third party agreed with Waldrip to drill. Waldrip asked Hamon for the assignment of the lease. Hamon tendered an assignment to the "Humphreys sands and Humphreys sands only." The plaintiff refused this assignment, contending the contract required an assignment from the surface to the Humphreys sands. The court construed the language of the agreement as including all the area from the surface to the Humphreys sand and ruled accordingly.

\section*{§ 10.06. Segregation of Oil Rights from Gas Rights.}
Geologically, all oil producing formations contain at least a small amount of natural gas and all natural gas formations include at least trace amounts of oil. Consequently, the severance of oil rights from gas rights is, strictly speaking, not a horizontal division but a division of substances instead.

In severing oil from gas, definition of oil wells or gas wells should be drafted precisely. The parties operating rights should be addressed and provisions be made for accounting for gas production by the oil operator and for oil production by the gas operator.

A monumental opinion concerning the severance of oil from gas was handed down by the Court of Appeals for the Fifth Circuit in *Pan Eastern Exploration Co. v. Hufo Oils.*

In a 36-page opinion, the court considered a number of issues. The plaintiff was the owner of natural gas rights in the panhandle field of Texas. Hufo Oils was the owner of oil and casinghead gas rights. Under the Texas Railroad Commission's classification rules, oil and gas wells are classified according to the ratio between the amount of oil produced and the amount of gas produced.

If the gas to oil ratio (GOR) is greater than 100,000 cubic feet of gas per barrel of oil, the well is classified as a gas well; if the GOR is less than or equal to 100,000 cubic feet of gas per barrel, the well is classified as an oil well. If the GOR was less than 100,000 cubic feet of gas per barrel, the operator of the oil well could produce the natural gas and market it as casinghead gas, and was not required to account to the gas owner.

Due to the high demand and consequently high price for gas, oil well operators sought to maximize their casinghead gas production within limits that would maintain the well's classification as an oil well. Towards this end, oil operators engaged in completion and production practices of dubious legality. An operator would install LTX units (low temperature extraction) at the well head. These units would extract volatile hydrocarbon liquids called "white oil" which would be counted as oil in computing their GOR and classifying their wells as oil wells.

Since a good deal of the gas volume could be converted to a liquid, a well that would otherwise be a statutory gas well could be converted into a statutory oil well by installing an LTX unit.

The second dubious practice was referred to as "high perforations completion." The oil operator would drill the wells to the deeper oil producing strata but would perforate the well at higher levels known primarily for gas production. By producing both oil from the deeper zones and gas from the higher zone, the operator could produce both oil and gas but stay within the GOR classification of an oil well, with or without an LTX unit.

Panhandle sued Hufo for converting its gas by these alleged illegal practices. The case was made more complex because the gas produced by Hufo was purchased by Panhandle Eastern Pipeline Co., an entity related to the plaintiff. Evidence at trial indicated that both Panhandle Eastern Pipeline and Pan Eastern Exploration were aware of the production practices, but intentionally chose not to pursue the issue since Panhandle Eastern Pipeline needed the gas to meet its contractual supply obligations.

The jury ruled in favor of Hufo, finding that the defendant had not converted plaintiff's gas. However, the Findings of Fact did not specifically address whether the jury's verdict was based on the issue of consent (consent is a defense to conversion), or on a finding that the defendant had not taken the plaintiff's gas. The court ruled that the filing of the lawsuit was an effective way to terminate any consent.

Therefore, that part of the jury's verdict finding no conversion was reversed since the taking, if proven,
became non-consensual at that time and unlawful.\(^{(38)}\)

§ 10.07. Drafting Considerations to Effectuate Horizontal Division of Oil and Gas Leaseholds.

In drafting deeds, assignments, leases, or other documents to effectuate a horizontal division of oil and gas rights, one should address the following issues:

1. easements and operating rights through all formations overlying the subject formation;
2. right of different operators to use the surface for their operations, including documentation to effectuate record notice;
3. access to geological information concerning a formation owned by one party as obtained by the other party;
4. precise description of the formation or formations;\(^{(39)}\)
5. rights, liabilities, and obligations of each party under the existing lease;
6. provision for each party's responsibility for payment of delay rent, royalty, shut-in royalty, and similar payments necessary to maintain the leasehold;\(^{(40)}\)
7. specification of a dominant and servient relationship between the segregated leaseholds where intended;
8. option of owner of one strata to take over the well prior to abandonment by owner of another strata for the purpose of either deepening or plugging back; and
9. severances of oil from gas drafted precisely to include provisions for center-party accounting for production of the other substance.\(^{(41)}\)

§ 10.08. Conclusion.

This Chapter has illustrated a number of operational and legal consequences which may result from the horizontal division of oil and gas leaseholds. In any transaction which will result in the horizontal division of oil and gas leaseholds, the factors set forth herein should be considered to assure the adequate protection of the rights and interests of all owners of the individual stratum.

3. 

4 For further discussion, see also V. N. Meyers, 4 Eastern Min. L. Inst. ch. 17 (1983).

5 See text, infra, at § 10.04.

6 Harry Bourg Corp. v. Union Producing Co., 197 So. 2d 172 (1967).


9 Rogers v. Westhoma Oil Co., 291 F.2d 726 (10th Cir. 1961) (jurisdiction based on diversity; basis interpreted in accordance with Kansas law).

10 Id. at 728.

11 Id. at 731.


13 Id. at 795.

14 Id. at 795.
15. *Id.* at 796.


18. *Id.* at 115.


21. *Id.* at 669.

22. Carter Oil Co. v. McCasland, 190 F.2d 887 (10th Cir. 1953).

23. *Id.* at 889.

24. *Id.* at 890.

25. Subsequent to the above case, a separate action for accounting was filed in *Carter Oil Co. v. McCasland* at 207 F.2d 728 (10th Cir. 1953). The action requested that McCasland be required to account to Carter for the cost of the wells drilled to the depths below 4,000 feet. Testimony showed that the entire formation could be depleted by McCasland's wells and that, consequently, the Carter wells did not result in any benefit to McCasland. Therefore, McCasland was not required to account to Carter for the cost of drilling said wells.

26.

27 Kidwell v. General Petroleum Corp., 300 P. 1 (Cal. 1931).

28 Id. at 2.


30 Id. at 4.

31 Pan Eastern Exploration Co. v. Hufo Oils, 855 F.2d 1106 (5th Cir. 1988).


33 Although the gas owner owned the natural gas, the oil owner owned the casinghead gas rights.


35 Pan Eastern Exploration v. Hufo Oils, 855 F.2d 1106 (5th Cir. 1988) at 103.

36 Id. at 112.

37 Id. at 126.
The summary of the *Pan Eastern Exploration Co. v. Hufo* case is a simplified version of the facts and holding of the case. A number of additional issues were discussed at length in the court's opinion.

39. See text, *supra*, at § 10.05.

40. See text, *supra*, at § 10.03 [2]-[4].

41. See text, *supra*, at § 10.06.