

## Timing “Externalities” Imposed by Mineral Ownership Law: Coasean Versus Lockean Remedies

**John Brätland**

U.S. Department of the Interior

---

### Abstract

Fragmented and incompatible property interests of land-ownership law impose externalities in which surface-royalty owners can preclude timing adaptations in the management of mineral resources such as petroleum. This externality takes the form of a misallocation over time because the capital decisions required for economic conservation are foreclosed to extractive enterprises. Resources are not managed in a socially beneficial way. Can extractive enterprises viably initiate Coasean bargains with surface owners to obtain requisite rights to efficiently allocate resources over time? The paper concludes that a basis for bargaining between surface owners and extractive enterprises does not exist. However, an economic (and just) solution is found in neo-Lockean original appropriation in which the first to discover and develop resources acquire equitable and secure ownership.

---

*JEL Codes:* D02, D23, K11, L72, Q32

*Keywords:* Economic waste; Economic conservation; Coasean bargains; Extractive enterprise; Surface owner; Original appropriation; Implied covenants; Petroleum; Royalty estate

### I. Introduction

In an economic sense, a mineral resource such as petroleum is conserved by the resource owner's efforts to maximize the capitalized value of the resource. These decisions require judgment regarding prospective market uncertainty and the flexibility necessary to adapt to changing market conditions. In other words, economic conservation requires adaptive managerial decisions in the timing and scale of exploration, development, and production and the property rights necessary to do so. But the institutions of land-ownership law foreclose this adaptation and hence impose a *timing externality*. This foreclosure of adaptation is William Blackstone's juristic legacy declaring that surface owners also own all that is below and within

the boundaries of their land.<sup>1</sup> In America, one of the consequences of Blackstone's stipulation is that enterprises are barred from becoming full owners of *in situ* petroleum resources that they discover and develop.<sup>2</sup> Court enforcement of *implied covenants* protects the royalty interests of the surface owner but, at the same time, also precludes actions necessary to achieve economic conservation of the resource *over time*.<sup>3</sup> Conservation is premised on requisite timing latitude in exploration, development, and production. But the covenants govern the management of the petroleum resources but preclude the *timing latitude* to necessary to avoid the economic externality of waste (Brätland, 2001, pp. 693–94).

In the case of petroleum lands, the application of this Blackstonian principle has not meant that the surface owner actually owns subsurface petroleum; rather, it has come to mean that the surface owner is always entitled to a percentage share of gross production or a percentage share of the *gross sales proceeds* (royalties) once the resource is produced. Hence, the surface owner (as a royalty owner) and the extractive enterprise have mutually incompatible objectives (Brätland, 2001, p. 694). Because expedited production is to the advantage of the royalty owner, a managerial decision to delay activities on the lease diminishes the capitalized value of surface owner's royalty interests;<sup>4</sup> hence, to protect these interests, the courts impose fiats that forbid the adaptive latitude in timing that is critical to economic conservation of the resource.

But defenders of current jurisprudence assert that Coasean bargains can be struck between the extractive enterprise and the surface owner in which the former bribes the latter for rights to full discretion with respect to the timing and management of exploration,

---

<sup>1</sup> The 'common-law' reference is to Blackstone: (1983 [1766]). Robert Bradley was perhaps the first to explicitly note the consequences of Blackstonian property law for the current ownership institutions governing the exploitation of petroleum (Bradley, 1996, pp. 70–74). Bradley observes: "U.S. property law, under the dominance of the English law of the commons, uncritically adopted the notion that possession of the surface also entitled ownership of the sky above and the ground below it" (Bradley, 1996, p. 70). These issues are discussed at greater length below.

<sup>2</sup> The term *in situ* refers to the un-extracted resource in the ground.

<sup>3</sup> Historically, these court-imposed covenants were thought to be necessary because lease agreements did not usually set explicit requirements for operation of the lease or marketing of the product.

<sup>4</sup> The royalty is a contractual percentage of gross sales revenue. Hence, the royalty owner has no interest in net present value in which costs are taken into account.

development, and production.<sup>5</sup> *In essence, the extractive enterprise would be bargaining with the surface owner (royalty owner) for the right to engage in speculative timing of operations.* However, there are largely unacknowledged questions. (1) Could ‘Coasean bribes’ induce a surface owner to relinquish future royalties in exchange for some form of compensation from the extractive enterprise? (2) Equivalently, would the petroleum enterprise ever be in a position to offer such a Coasean bribe to obtain the rights to choose the timing and scale of activities on the resource-bearing property? (3) If such an exchange were possible, could the allocative consequences be such as to allow the avoidance of the waste described above? But even if a type of exchange were likely, Coasean bargains seem to ignore the legitimate ownership issues bearing on the just control of the capital investment required for the development preceding extractive recovery.

Can a more economic and just solution be found in Lockean ‘original appropriation’<sup>6</sup> in which the first discoverer of a deposit or reservoir would become the sole owner of the discovery? The principle of ‘original appropriation’ would supplant the Blackstonian perspective on the scope of the surface owner’s property rights. Of course, some consent would still be required to obtain surface access from some surface owner to allow exploration. In other words, the lease agreement between the surface owner and the enterprise would be strictly for surface access. Court-imposed covenants would no longer impinge on the extractive enterprise’s timing and planned scope of investments in the project.

## **II. Economic Conservation (Externality Avoidance) in the Real World**

Economic conservation of petroleum requires actions aimed at maximization of the present value of the resource (McDonald, 1971, p. 71). Uncertainty and market change necessarily make economic

---

<sup>5</sup> See generally Ronald H. Coase (1960, pp. 1–44). Earlier reviewers insisted on advancing this view.

<sup>6</sup> Murray Rothbard noted the applicability of Lockean original appropriation to the petroleum deposits: “Where for example an oil company, ...lays claim to the oil field which it discovers and drills, then this is its just...private property...” (Rothbard, 1998, pp. 71–72). Robert Bradley has expanded on Rothbard’s insight in developing procedures that would be applied in practice (Bradley, 1996, pp. 70–74). These issues are discussed at greater length below.

conservation a very dynamic and adaptive process. Real markets are always uncertain, which means that the actions of any enterprise require subjective, adaptive judgment. These features apply with particular force to petroleum markets. Hence, economic conservation must be a process of continuous discretionary adaptation in timing of investment in resource development.<sup>7</sup> These responses may include one or both of the following: (1) delay operations if the net capitalized value of the *in situ* resource is increasing at a rate exceeding the rate of return on the next most profitable investment, and (2) adapt the timing of investments in exploration and development in response to previously unexpected change in the market.

In addressing the practical aspects of this timing issue, Stephen McDonald offered the following caveat:

The optimum time-distribution of production is defined for one point in time only. It changes as its determinants change from point to point in time. In particular, it changes with every change in current and expected costs and prices.... Thus, continuously maximizing net present value *requires flexible adjustments* in the time-distribution of production as the economic values reflecting sacrifice and gains of satisfaction (costs and prices) change over time (McDonald 1971, 83-84).

The need for flexibility also has a direct relevance to the timing of all exploration and development activities that must precede production. The fact that resource markets are subject to persistent change and economic uncertainty gives rise to a multiplicity of expectations and plans on the part of those considering exploration or development decisions. But such judgments can only be tentative prior to the commitment of investment in capital goods. Nonetheless, the need for adaptive flexibility is seen in the fact that “optimal-timing decisions” change through time as the expectations and perceptions of extractive enterprises evolve with market conditions.

---

<sup>7</sup> No such decisions would be made unless the estimated net benefits of current recovery were judged to exceed the subjective judgment of *user cost*. User cost is a subjective and speculative reckoning of marginal future net returns relinquished from a decision to produce in the present (Lachmann, 1986, pp. 66–67).

The degree to which an enterprise's plan is "optimal" can have meaning only within the context of the extractive enterprise's own decision-making; there is no "socially-optimal plan" that can be defined and imposed through regulatory decrees, as are common in leasing institutions. Moreover, what is never acknowledged is the fact that society would derive a benefit from the diversity of timing perspectives held by all extractive enterprises. By exercising such latitude over large numbers of properties, competing extractive enterprises would render a "conservation" service by making the timing decisions that would result in production when it is valued most highly by society. *This happy circumstance is the essence of avoiding the externality of economic waste and achieving economic conservation.*<sup>8</sup>

### III. Modern Law of Petroleum Lands and Blackstone's Legacy

If petroleum conservation represents investment adapted to uncertain markets, do the institutions of mineral exploitation accommodate this reality? In fact, the ownership institutions bearing on economic conservation of extractive resources are entirely at odds with these requisite rights of property. The unsatisfactory state of petroleum law is evident in dictums on the spatial scope of land ownership, which seems to bar discoverers from acquiring full ownership in subsurface resource discoveries.

#### *A. The Emergence of Fragmented, Attenuated, and Conflicting Property Claims*

The surface land owner's rights to subsurface resources were first enunciated by William Blackstone in the following statement: "land hath also, in its legal specification, an indefinite extent, upwards as well as downwards...whatever is in direct line between the surface of any land and the center of the earth....if a man grants all his lands, he thereby grants all mines of metal and other fossils. This is incorporated in the fundamental law of the land" (Blackstone, 1983 [1766], p. 18). This statement seems to have influenced the entire direction of jurisprudence of land ownership jurisdiction. But, as Robert Bradley has observed, this interpretation of mineral ownership encountered difficulties in its application to *in situ* petroleum and the unusual properties of petroleum reservoirs

---

<sup>8</sup> The issue is not solely one of physical waste. *The issue addressed here is the economic waste arising from the capital value lost because of the timing constraints imposed by traditional leasing institutions.*

(Bradley, 1996, p. 70). These properties include the following: (a) the spatial extent and configuration of reservoirs may lie under the land of several different surface owners; (b) the apportioning of petroleum ownership is not possible because the volume, size, or extent of the deposit is uncertain; and (c) the migratory nature of petroleum within the reservoir means that resources can be extracted from the reservoir in a manner that draws the resource from beneath the land of several different competing surface owners (Bradley, 1996, p. 70).

The fact that petroleum migrates laterally within a subsurface structure has fostered an acknowledgment of the *rule of capture*. The petroleum is not actually owned by anyone until it is captured at the surface in the process of production. The rule of capture applies irrespective of the fact that the petroleum resources may have migrated from beneath another surface owner's property.<sup>9</sup>

In a sense, the *rule of capture* appears to partly nullify Blackstone's conception of property ownership in land. But his interpretation of the surface owner's rights is the ostensible basis of the surface owner's right to a royalty share of the petroleum finally captured at the enterprise's wellhead. In an *ex ante* sense, the possibility of a royalty payment on what is produced is premised on the petroleum deposit yielding a surplus of economic income over and above all of the opportunity costs incurred in the exploration, development, and production of the resource. However, the pervading uncertainty attendant to discovery seems to warrant a royalty payment *contingent* on production because prior to a sufficiently economic discovery of petroleum there is no assurance that any economic rent even exists. A fixed percentage royalty on the *gross market value* of the resource sold allows the surface owners to capture economic rent on a contingent basis.<sup>10</sup> The appeal of this system is the fact that extractive enterprises can obtain leases with lower up-front bonus payments, and surface owners are provided with a means of sharing investment

---

<sup>9</sup> The migratory nature of petroleum creates the problem of competitive production. One solution is agreement to form a unitized operation in which production would be placed under the management of one operator; this operator would be chosen by the enterprises in a position to recover petroleum from the affected reservoir. The general subject of unitization is discussed in a variety of places. For example, see Weaver (1986), McDonald (1971).

<sup>10</sup> One should note that the fixed percentage royalty may capture revenue in excess of economic rent, in which case the extractive enterprise may be earning less than a competitive rate of return on invested capital.

uncertainty with the extractive enterprise. Viewed superficially, payment of royalties appears to be mutually beneficial.

Traditional criticisms of the royalty feature have focused on the fact that the fixed royalty creates an incentive to premature termination of recovery. The extractive enterprise would more quickly reach a point in which the marginal cost of production, inclusive of the fixed-percentage royalty, exceeds the market price obtainable on the incremental barrel produced. But royalties also create an incentive for the extractive enterprise to ‘delay’ operations on the lease. But the problem is deeper. In virtually all circumstances, the capitalized value of royalty-receivables depreciates with delay (Brätland, 2001, pp. 694–95). Hence, any delay in exploration, development, or production is always detrimental to the financial interests of the royalty-owning surface owner. Hence, the royalty-owning-surface owner will *demand extractive operations managed so that the present value of the gross revenue stream is as large as possible. But the central issue is that the fixed percentage royalty confronts the royalty-owning-surface owner and the investing extractive enterprise with conflicting objectives.*

#### *B. The Nature and Implications of Covenants Protecting the Royalty Estate*

Whereas the royalty owner’s principal concern is the gross value of the operation, the extractive enterprise’s chief objective is the maximization of net present value and having the flexibility required to seek this objective. For the extractive enterprise, delay in exploration, development, or production will sometimes be critical to the avoidance of the externality of economic waste, or equivalently, the efficient management of the investment project.

But the implied covenants implicitly compel the extractive enterprise to manage the project in ways that ignore the need for adaptive latitude. First, the extractive enterprise is obligated to *expeditiously explore* the lease. However, the implied covenant to expeditiously explore may be inconsistent with efficient conservation of the resource. Second, development of the discovered resource must be expedited even in light of enterprise’s judgment that such investment is premature (Lowe, 1995, pp. 305–6). If the extractive enterprise were to wait for what may appear to be an extended period without development, the extractive enterprise is vulnerable to a legal challenge from the surface owner. Third, the extractive enterprise has a duty to promptly protect the lease property from drainage by the activities of other extractive enterprises by drilling ‘offset wells’ or

protection wells and securing the production that would otherwise be lost to competing leases.

Hence, the surface owner's economic interests are defined by a rate of revenue recovery that maximizes the present *gross* value of the royalty based on a percentage of the gross revenue stream. Expedited gross revenue recovery is optimal for the surface owner, and the court-enforced covenants provide the means by which this objective can be met. An accelerated schedule means that royalty proceeds are acquired earlier and are available for investment in assets earning a competitive rate of return. Of course, as a practical matter, any rate of appreciation in the prospective royalty receivable will almost never, if ever, equal the rate of return obtainable by the surface owner from alternative investments. In fact, the surface owner earns a higher rate of return by extracting funds from royalty receivables and as quickly as possible investing in assets that earn a competitive rate of return. Hence, the possibility of discretionary adaptive latitude in timing must be foreclosed for the extractive enterprise to accommodate the surface owner's quest for expedited returns. As a presumptive owner of a time-stream of future royalties, the surface owner has no vested interest in seeing the lease efficiently managed as a capital asset. For the surface owner, asset value is based on gross value of the lease, which does not change over time in the way that the net present value does (Brätland, 2001, p. 695). In terms of the time value of money, the royalties receivable are more likely to be depreciating assets with delays in development and production.

But satisfying the economic interests of the surface owner means that economic rent is dissipated as the covenants impose exploration, development, and production decisions that can be wasteful from the perspective of economic conservation. The covenants foreclose management of the lease as a capital asset by necessitating lease activities that diminish the value of economic rent. Another source of waste and inefficiency is the fact that opportunity costs of expedited exploration, development, and production may well be increased.<sup>11</sup> Under normal market circumstances, a decision to expedite exploration or development would be made only if the estimated capital value of the project were increased by expediting. In summary,

---

<sup>11</sup> Opportunity costs of exploration, development, and production can be driven upward as a direct function of the extent to which production is expedited. Armen Alchian outlines general principles by which this increase occurs (1959, p. 23–40).

imposed artificial schedules make the surface owner and extractive enterprise economic adversaries because what is beneficial to one party is detrimental to the interests of the other.<sup>12</sup>

#### **IV. Likelihood of Remedial Coasean Bargains**

The covenants diminish the value to society of extractive resources. In this sense, the covenants impose a type of ‘externality’ on the extractive enterprise and society as a whole. This externality would be eliminated if the extractive enterprise were to have full discretion in the timing and scale of investment in exploration, development, and extraction of the resource. The covenants impinge on the actions of the extractive enterprise only if the royalty-owning surface owner chooses to impose their enforcement. But could Coasean bargains dissuade royalty owners from enforcing the stipulations of the implied covenants?

##### *A. What Coasean Bargains Would Need to Achieve*

The viability of Coasean bargaining is premised on the notion that if one party inflicts damage upon another, an agreement can be struck in which either the damaged party pays the damaging party to terminate the damage or the damaging party pays the damaged party for the damage inflicted. The negotiation sifts out the least costly resolution. The Coase theorem states that if transactions costs are not a barrier, then the two parties will negotiate a mutually beneficial trade regardless of the initial holdings of property claims. One of the issues explored here is the extent to which the situation facing the extractive enterprise and the surface owner is such as to render Coasean bargains a viable course of action. Is there a realistic basis for negotiation between these parties? But a more fundamental issue bears on the implicit affirmation of given property rights. Assuming that some type of Coasean bargain were possible, what issues bear on just property rights?

In the case under consideration, transaction costs may not be a significant barrier if only two parties are involved: the surface owner and the extractive enterprise. An important point to note at the

---

<sup>12</sup> Investment in the capital goods required in extraction establishes sole ownership of these goods by the extractive enterprise. All legitimate property ownership is premised on rights of possession, disposition, and use (Epstein, 1985, p. 59). The implied covenants remove these rights from the owner and are, hence, a breach of such ownership rights (Glassmire, 1935, pp. 210–11).

outset is that both parties will consider a two-track negotiation. Each will attempt to compare the gains and losses associated with (a) the conventional lease in which the extractive enterprise pays a competitive royalty percentage if petroleum is discovered and the surface owner enjoys the ‘royalty protections’ afforded under court-imposed covenants, and (b) an unconventional agreement in which the surface owner relinquishes all or part of the conventional royalty income and is bribed by the extractive enterprise for the right to engage in adaptive timing and management of the lease as a capital asset. This latter alternative agreement, whatever its form, would nullify the royalty protections of the covenants that would normally attend a traditional lease. But in essence, the extractive enterprise seeks to offer something to the surface owner that would prompt the owner to allow adaptive timing in all of the subsequent activities.

The likelihood of an agreement between the surface owner and the extractive enterprise depends upon what, if anything, each are able to offer in exchange. Consider the situation faced by the surface owner. He does not know if petroleum exists beneath the surface of his land. He also knows that he needs the extractive enterprise to conduct exploration to determine whether or not petroleum is present. As a ‘fall-back position,’ the surface owner is assured the option of a traditional lease agreement in which he obtains a royalty percentage of all that may be produced. If no petroleum is found, the surface owner has lost nothing. But if an economic discovery is made, the surface owner (as a royalty owner) has the protection of the court-imposed covenants virtually assuring that *that the present gross value of the project to the surface owner is maximized*. But this maximization is a source of economic waste—an economic externality, as it were. In considering the prospect of a Coasean bargain, one confronts the question: what is the extractive enterprise in a position to offer the surface owner for the rights to manage a prospective discovery as a capital asset?

Assume that the extractive enterprise were somehow able to know that petroleum is present in ample quantities and know the exact volume of resources that can be recovered. Of course, in this imaginary circumstance, the surface owner would also have this information. The extractive enterprise would still face price and cost uncertainty in developing and producing the resource. The extractive enterprise would know that in the traditional lease, it would be paying the surface owner a percentage share of what is produced throughout

the productive life of the reservoir. The enterprise would also know that it would be prevented from any adaptive timing in seeking to maximize the *net present value or capital value* of the resource. Suppose also that the extractive enterprise were able to estimate the loss in capital value that would follow from compliance with the implied covenants. In principle, the extractive enterprise should be prepared to pay (bribe) the surface owner for the right to engage in adaptive timing an amount that should approach the projected reduction in capital value that would arise from entry into a traditional lease agreement. However, the extractive enterprise would avoid offering the entire amount because such an offer would render the Coasean bribe pointless. The question is the following: *Is there any portion of a share of a larger net present value that would compensate the surface owner for a relinquished royalty share of an expedited gross present value?*

Obviously the answer to this question depends upon four elements: (1) the expected time-path of petroleum prices, (2) the cost associated with development and production, (3) the present value of the royalty share of gross receipts associated with *expedited* production under the traditional lease agreement with its implied covenants, and (4) the negotiated share of the of the capital value arising from a production schedule chosen by the extractive enterprise. If certain conditions were met, a Coasean bargain could be struck that would allow the extractive enterprise to ‘buy’ the right to engage in adaptive timing, specifically, if the estimated amount (3) were somehow smaller than the estimated amount associated with (4). One of the conditions that may make such an agreement possible is if the royalty rate associated with a conventional lease agreement were low enough to make (3) relatively smaller than (4). However, the royalty rate itself would be the subject of negotiation between the surface owner and the extractive enterprise in a conventional lease agreement. This rate would be subject to competitive pressure because the surface owner may be able to deal with another a competing extractive enterprise. A variation on a negotiated solution would be one in which the surface owner relinquishes only a portion of (3) in exchange for (4), but any such agreement would need to be premised on the assurance that (4) would exceed (3) by an amount that would make such a tradeoff mutually beneficial for both parties.

At this point, one reflects on the fact that the likelihood of the agreement described above is premised upon the existence of information that can never exist, even subsequent to a successful

discovery. Prior to any agreement, neither party would know if the subsurface contained anything of value. With a conventional lease agreement, the surface owner is assured of a competitive royalty percentage of gross proceeds *if* an economic discovery is made, and the extractive enterprise is assured that it must relinquish the royalty share if an exploratory effort is successful. But is there a basis for the negotiation of an unconventional lease in which the extractive enterprise buys the right to choose the timing and scope of exploration, development, and production? Clearly there is not. The extractive enterprise would have no basis upon which to make such an offer. In the event that there were a discovery, the estimated net present value based on a prospective production schedule may be small. The discovery may be one in which the extractive enterprise is able to offer no bribe to the surface owner to relinquish all or part of the gross proceeds that would accrue from the royalties on a lease.

#### *B. Principal Barriers to Bargains*

The Coasean bargains under consideration here involve an upfront payment by an extractive enterprise to a surface owner for the rights to have complete control over the scope and timing of exploration, development, and production. The conventional wisdom is that the efficacy of Coasean bargaining is premised on transaction costs not precluding voluntary agreement. Whereas transaction costs are traditionally assumed to be the main impediment to the negotiation of a Coasean bargain, in this circumstance, these costs would not be the main barrier. Ignorance and the mutual absence of ownership are the principal obstructions to the realization of any Coasean bargain; both parties would be ignorant of what is received and what is relinquished in arriving at an agreement. The object of bargaining exists only on a contingent and highly uncertain basis (an economic discovery). The existence and extent of the capitalized value is also totally contingent not only on the nature or size of the discovery but also on the future of the market for both petroleum and the factors of production required for production. There is no basis for any negotiated agreement that would replicate the property rights necessary to assure the requisite latitude in timing of exploration, development, and production.

## V. Lockean Original Appropriation of Subsurface Resources

Were Coasean bargains ever feasible, the extractive enterprise would be placed in a position of ‘buying back’ some of the discretionary latitude necessary for the management of its own property. But aside from the fact that the extractive enterprise would be bargaining for control of its own property (capital investments), does the breach of ownership equity have wider implications? Does the Blackstonian premise behind the surface owner’s claims extend to subsurface resources and the requisite claim to royalties on the sale of such minerals? What is the equitable basis for such a property claim? Alternative ownership institutions that would avoid economic waste and the breach of ownership equity are to be found in Lockean original appropriation of economic discoveries by first discoverers.

### *A. The Original Appropriation as a Means to Full Ownership of Discoveries*

Robert Bradley has explored the idea of original appropriation and has examined its implications. For example, first discoverer’s ownership claim would apply only to the reservoir discovered. Other reservoirs contiguously located above, below, or near the discovered, appropriated reservoir would not be part of the first discoverer’s legitimate ownership claim. But, the appropriator’s property rights would be protected under the law; another driller or operator attempting to drain the claimed reservoir through directional drilling would be guilty of invasion and subject to legal action once the theft is detected (Bradley, 1996, pp. 70–71).<sup>13</sup>

With original appropriation as the basis of property acquisition, the surface owner would have no presumptive property claim to a royalty share of production. But because the extractive enterprise would require access to surface land to conduct exploratory activities, would not the surface owner still be able to extract economic rent in bargains over the lease rights to use a surface area for drilling? In general, the answer is *not necessarily*. Instances would certainly arise in which the surface owner would have such bargaining power, but in many cases, this power would probably not exist. In each situation,

---

<sup>13</sup> Lockean original appropriation is contingent upon one being able to somehow transform an unowned resource. Bradley observes: “In the case of first title [original appropriation of surface land], it is the surface land that has been transformed, not minerals below....A tenable theory of first-title rights should have consistent application....” (Bradley, 1996, pp. 70–71).

the answer would hinge on rights of voluntary contractual exchange and the modern engineering of oil exploration and production.

Under current petroleum law, drilling in a directional manner to explore for reserves under adjoining properties is a form of trespass (Williams and Meyers, 1993, p. 27). Under rules of property in which first discovery establishes ownership, the extractive enterprise would not be constrained by this legal sanction. The extractive enterprise would need to acquire surface access *somewhere* to explore and exploit an oil reservoir. Clearly, this surface access must be somewhere within the vicinity of the suspected location of the oil reservoir. However, the surface access need not be obtained from the owner of the surface directly over the site. The enterprise would not be restricted to vertical drilling and hence would be able to use directional drilling to reach numerous subsurface petroleum prospects. This fact would considerably reduce the bargaining power of any surface owner in attempting to extract any future economic rent that may accrue from an economic discovery. But in any case, there would need to be some mutually voluntary contractual fee paid to *some* landowner for access.

#### *B. The Elimination of Economic Waste*

Under the Lockean principle of original appropriation, the first extractive enterprise to make the discovery would become the sole controlling owner of the entire reservoir. Although the extractive enterprise may have had to enter into a surface-access agreement with a surface owner, requisite compliance with implied covenants would be avoided. Hence, important economic advantages would accrue from reservoir owners because they would be able to pursue their respective goals under institutions that respect their legitimate property rights and freedom of contract. The extractive enterprise would be free to engage in discretionary adaptive latitude in timing. Because the size of economic rent would be a function of the enterprise's management of the reservoir, the appropriable economic benefit would largely accrue to the owner of the reservoir. Economic profits that may accrue from the development, production, and sale of petroleum would be the sole property of the reservoir discoverer and owner. The owner of the reservoir would not be encumbered by implied covenants. The reservoir would be under one control by the exclusive owner, who would be able to manage the reservoir as a capital asset. The owners would be free to alter plans in the face of

anticipated changes in the market. In other words, the timing of oil and gas operation would again be brought into the productive and critically beneficial realm of discretionary adaptive latitude in timing of investments.

The problems associated with the ‘rule of capture’ would be eliminated because the operation would already be unitized under the control of one property owner. Moreover, the migration of petroleum within a reservoir would not be an issue because the owner would have complete control over the structure. This would obviate the need for unitization. Original appropriation of the reservoir by first discovery would achieve a far more efficient means to a unitized operation. But more generally, original appropriation fosters the ability of the reservoir owner to manage the resource in a way that maximizes its value to society.

## **VI. Conclusion**

This paper examined the implied covenants of petroleum law and the economic waste imposed by their enforcement by the courts. This economic waste occurs because the covenants thwart the managerial processes and negate the property rights that are essential to the process by which the economic conservation of the resource is achieved. This negation of the extractive enterprise’s managerial discretion in the timing and scale of exploration, development, and production reduces the investment value of the extraction process and diminishes the social value of the resource to society. In this sense, the implied covenants impose a ‘social loss’ or an externality.

Do Coasean bargains provide a realistic and ethical remediation for this problem? Can the extractive enterprise bargain with the surface owner for the property rights required to efficiently manage the resource? Although transaction costs are commonly assumed to be the principal impediment to the consummation of Coasean bargains, in this case, the obstruction is found in ignorance and a mutual absence of ownership. Both parties would be ignorant of what would be received and what would be relinquished in arriving at an agreement. The capitalized value that hypothetically could be the object of bargaining exists only on a contingent and highly uncertain basis (an economic discovery). Moreover, this capitalized value is also dependent not only on the nature or size of the discovery but also on the anticipated future of the market for both petroleum and the factors of production required for production. No basis would exist

for any negotiated agreement that would replicate the property rights necessary to assure the requisite latitude in timing of exploration, development, and production. But even if such bargains were ever feasible, they imply an ethical breach in that such arrangements would place the extractive enterprise in the position of having to buy control of the capital assets that it already owns.

*The solution requires new legal institutions of ownership that respect the Lockean basis for the ethical acquisition of property rights.* Original appropriation of discovered reservoirs would solve many of the problems associated with the contemporary structure of property rights impinging on the production of petroleum. The conflict, breaches of equity, and implied covenants devolving from current property law would not exist if the discovered petroleum deposit were to become the sole, exclusive property of the extractive enterprise making the discovery. The principle of ‘original appropriation;’ would supplant the Blackstonian perspective on the scope of the surface owner’s property rights. Moreover, original appropriation would provide extractive enterprises with the investment latitude necessary to achieve economic conservation of the resource.

## References

- Alchian, Armen. 1959. “Costs and Output.” In *The Allocation of Economic Resources*, ed. Moses Abramovitz, 23–40. Stanford, CA: Stanford University Press.
- Blackstone, William. 1983. *Commentaries on the Laws of England, Volume 2*. New York, NY: Legal Classics Library. Special Ed. (Orig. pub. 1766.)
- Bradley, Robert L. 1996. *Oil, Gas and Government: The U.S. Experience*. Lanham, Maryland: Rowan & Littlefield Publishers, Inc.
- Brätland, John. 2001. “Economic Exchange as the Requisite Basis for Royalty Ownership of Value Added in Natural Gas Sales.” *Natural Resources Journal*, 41(3): 694–95.
- Coase, R.H. 1960. “The Problem of Social Cost.” *Journal of Law and Economics*, 3(Oct.): 1–44.
- Epstein, Richard A. 1985. *Takings: Private Property and the Power of Eminent Domain*. Cambridge, MA: Harvard University Press.
- Glassmire, Samuel H. 1935. *Law of Oil and Gas Leases and Royalties*. St. Louis, MO: Thomas Law Book Company.

- Lachmann, Ludwig. 1986. *The Market as an Economic Process*. New York, NY: Basil Blackwell, Ltd.
- Lowe, John. 1995. *Oil and Gas Law*. St. Paul, MN: West Publishing Company.
- McDonald, Stephen L. 1971. *Petroleum Conservation in the United States: An Economic Analysis*. Baltimore: The Johns Hopkins Press.
- Mead, Walter J., Asbjorn Moseidjord, Dennis D. Muraoka, and Phillip Sorensen. 1994. *Offshore Lands: Oil and Gas Leasing and Conservation on the Outer Continental Shelf*. San Francisco: The Pacific Institute.
- Mead, Walter J. 1994. "Toward an Optimal Oil and Gas Leasing System." *The Energy Journal*, 15(4): 1–18.
- Mises, Ludwig von. 1998. *Human Action: A Treatise on Economics, The Scholar's Edition*. Auburn AL: Ludwig von Mises Institute.
- Rothbard, Murray N. 1998. *Ethics of Liberty*. New York, NY: New York University Press. (Orig. pub. 1982.)
- Weaver, Jacqueline Lang. 1986. *Unitization of Oil and Gas Fields in Texas: A Study of Legislative Administrative and Judicial Policies*. Washington, D.C.: Resources for the Future.
- Williams, Howard R., and Charles J. Meyers. 1993. *Oil and Gas Law: Abridged Edition*. New York, NY: Matthew Bender Co., Inc. Sec. 203.1-203.3.