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Diligence Requirements in Federal Natural Resource Sale and Leasing

INTRODUCTION

The federal government owns 726.7 million acres or about thirty-two percent of the land in the United States.¹ It also controls vast offshore acreage.² These land holdings place large quantities of natural resources under federal stewardship. Federal lands have produced substantial amounts of major energy resources including crude oil, natural gas, coal and geothermal steam. Federal energy leases produced oil shale, tar sands, gilsonite (asphalt), and uranium. Other nonenergy minerals, including phosphate, sodium, potassium (potash), sulphur, and lead have been mined commercially on federal lands. In addition, federal lands also contain other hardrock minerals³ and mineral materials in commercial quantities.⁴ Large quantities of wood and wood products are also taken from federal lands. Rather than develop resources itself, the federal government has instead opted to transfer exploration and development rights to the private sector. Broad guidelines for selling or leasing of these resources from federal lands have been specified by Congress. As the trustee for these important national assets, the government has an obligation to manage efficiently. Failure to do so wastes resources and lowers living standards.

Private lessees of federal lands have long been encouraged through the force of federal law and policy to explore and develop leases "diligently." However, nowhere in federal law is diligence defined. Generally, diligent production has come to mean sooner rather than later production of a resource. On mineral leases, where exploratory activities may be necessary, diligent exploration appears to require exploration without delay. If reserves are discovered in commercial quantities, a decision by a lessee

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1. U.S. Department of the Interior, Bureau of Land Management, 171 *Public Land Statistics* 1986, at 5 (Mar. 1987).

2. Offshore lands extending outward from adjacent state jurisdiction (usually three miles) to "the limit of operability" are under U.S. government control. This area is known as the Outer Continental Shelf.

3. Uranium and lead are hardrock minerals. Other hardrock minerals include, but are not limited to, copper, zinc, magnesium, nickel, tungsten, gold, silver, bentonite, barite, feldspar and fluorspar.

4. Mineral materials include, but are not limited to, sand, gravel, clay, top soil and stone.

to withhold production would be described as "nondiligent development." But these definitions ignore the fundamental question of whether society is made better off if leaseholders are pressed to produce these resources for current consumption rather than save them for future consumption.

ECONOMIC ANALYSIS OF FEDERAL SALE AND LEASING PROCEDURES

Before answering this fundamental question, it is necessary to identify the basic economic goals of natural resource management. Economists widely agree that the goal of natural resource management policy is to maximize the present value of the economic rent derivable from resources.⁵ Economic rent is the payment to a factor of production, like public lands, above that necessary to keep the factor in a particular use. From the perspective of welfare economics, the economic rent of federal lands is the difference between the discounted social value of the revenues generated from the land, and the discounted social costs incurred in generating this revenue. All costs and revenues are stated in present values because they occur at different points in time. Social costs include all necessary costs of production. They are the payments for labor, capital, energy and all other inputs economically necessary to develop the land. They also include the value of damage to the environment due to development. They do *not* include payments to the government for the right to develop federal lands. These payments are not economic costs, but are transfer payments from the private to the public sector. Economists recommend the development of any resource having a positive net present value. The optimal timing of exploration and development is determined by maximizing the present value of the resource. The maximization of economic rent is the economic meaning of resource conservation.

Natural resource sale and leasing procedures affect the economic rent that can be derived from a resource. Those procedures which lead to excessive costs, reduced revenues, or the suboptimal timing of development, reduce economic rent and are to be avoided. Thus, a policy that forces early production, when later production would increase the present value of the resource, reduces the economic rent that accrues to the government and the American people for which it is the trustee.

Economic theory does not always favor sooner rather than later development of a resource. Sometimes, economic rent maximization leads to rapid development. Such is the case when resource prices are expected

5. See, e.g., STEPHEN McDONALD, *THE LEASING OF FEDERAL LANDS FOR FOSSIL FUELS PRODUCTION*, at ch. 3 (*Resources for the Future*, Washington, D.C., 1979), or WALTER J. MEAD, *OFFSHORE LANDS: OIL AND GAS LEASING AND CONSERVATION ON THE OUTER CONTINENTAL SHELF*, at ch. 2 (Pacific Institute for Public Policy Research, San Francisco 1985).

to remain constant or to decline, or when necessary costs are expected to increase. However, when resource prices are expected to rise rapidly or when necessary costs are expected to decline, economic rent can be increased by delaying development. Thus, diligent exploration and development ought not to be defined as sooner rather than later development, but instead as the set of lessee activities that maximizes the net present value of a resource.

In the following sections we will address two aspects of federal natural resource sale and leasing contracts that are intended to speed development. They are rental payments and the primary lease term. Next, we will analyze the effects of recent special policies designed to encourage the early development of coal and geothermal leases. We will also look at the unintended effect of the payment method on the timing of exploration and development. Finally, we will examine the impact that federal regulations have on diligent exploration and development.

Lessee Diligence and Rental Payments

Lessees are required to make several different types of payments to acquire the exclusive right to remove natural resources from federal lands. The three most important types of outlays are bonus payments, royalty payments and rental payments. A bonus payment is a one-time, nonrefundable cash outlay made at the time a lease is issued.⁶ Its size is usually determined by competitive auction. Royalty payments are made once production begins. They are defined as a percentage of the gross value of the resource produced, and the percentage is frequently set by federal law. Lessees are also required to make rental payments to the government on an annual basis for all oil and gas, mineral and geothermal leases. Rental payments begin when a lease is issued and (except for coal leases) end when production begins and when the royalty payment exceeds the rental payment obligation. These payments may be thought of as a penalty paid by lessees for failure to develop a lease. Rental payments are generally based on the number of acres leased and vary depending on the resource. Rental payments by resource are shown in Table 1.

The annual rental encourages early exploration and production from a lease because rental payments can be avoided by beginning production. They do not encourage resource conservation. Rental payments are viewed as costs by lessees, although they are really transfer payments. Ideally, transfer payments should not alter production timing. Such is not the case with rental payments. From the perspective of resource conservation,

6. Cash bonus payments are occasionally made in installments.

TABLE 1
Annual Rental Payments by Natural Resource

<i>Resource</i>	<i>Annual Rental</i>
Asphalt (in Oklahoma)	\$0.25/acre 1st year; \$0.50/acre 2nd through 5th years; \$1.00/acre each year thereafter
Coal	
Issued before 8/76	\$1.00/acre credited against royalty payments
Issued after 8/76	\$3.00/acre not credited against royalty payments
Indian leases	\$1.00/acre
Geothermal	Not less than \$1.00/acre
Gilsonite	\$0.50/acre
Hardrock Minerals*	\$1.00/acre
Mineral Materials**	None
Oil and Natural Gas	
Offshore	Determined on a lease by lease basis (usually \$3.00/acre)
Onshore	
Non-Competitive	\$1.00/acre or \$2.00/acre if known geological structure
Competitive	\$2.00/acre
Indian Leases	\$1.25/acre
National Petroleum Reserve, Alaska	Not less than \$3.00/acre
Phosphate (potash)	Not less than \$0.25/acre 1st year; \$0.50/acre 2nd and 3rd years; \$1.00/acre each year thereafter
Potassium	\$0.25/acre 1st year; \$0.50/acre 2nd through 5th years; \$1.00/acre each year thereafter
Sodium	\$0.25/acre 1st year; \$0.50/acre 2nd through 5th years; \$1.00/acre each year thereafter
Sulphur	\$0.50/acre
Timber	None

*Hardrock minerals include copper, lead, zinc, manganese, nickel, tungsten, gold, silver, bentonite, barite, feldspar, fluorspar, and uranium.

**Mineral materials include common variety sand and gravel.

Source: Code of Federal Regulations

rental payments are unnecessary. To the extent that they alter timing decisions, they are undesirable.

Supporters of rental payments argue that while federal lands remain leased but unproductive, the government is entitled to compensation. However, if leases are issued using competitive bidding, a rental payment has the effect of reducing the present value of the lease to prospective bidders who in turn will reduce the level of their bids. For this reason,

TABLE 2
Primary Lease Term by Natural Resource

<i>Resource</i>	<i>Primary Lease Term and Duration of Lease</i>
Asphalt (in Oklahoma)	Right to renewal after initial 20 year period and each 10 year period thereafter
Coal	20 years and as long as producing
Indian leases	10 years and as long as producing
Geothermal	10 years and as long as producing but not more than 35 years
Gilsonite	Each 20 year period subject to readjustment
Hardrock Minerals*	Right to renewal after initial 20 year period and each 10 year period thereafter
Mineral Materials**	
Non-Competitive	Not more than 5 years
Competitive	Not more than 10 years
Oil and Natural Gas	
Offshore	5 years (not to exceed 10 years) and as long as producing
Onshore	
Non-Competitive	10 years and as long as producing
Competitive	5 years and as long as producing
Indian Leases	10 years and as long as producing
National Petroleum Reserve, Alaska	10 years (or less)
Phosphate	Each 20 year period subject to readjustment
Potassium (potash)	Each 20 year period subject to readjustment
Sodium	Right to renewal after initial 20 year period and each 10 year period thereafter
Sulphur	Right to renewal after initial 20 year period and each 10 year period thereafter
Timber	Determined on a sale by sale basis (usually 3 to 7 years)

*Hardrock minerals include copper, lead, zinc, manganese, nickel, tungsten, gold, silver, bentonite, barite, feldspar, fluorspar, and uranium.

**Mineral materials include common variety sand and gravel.

Source: Code of Federal Regulations

anticipated rental payments are not borne by the lessee, but are borne by the lessor as lower bids.

Lessee Diligence and the Primary Lease Term

The primary lease term is the time period during which a lessee has the exclusive right to develop the land. For oil and gas, coal, and geothermal leases, if resources are discovered in commercial quantities, and if production begins during this term, the lease is routinely extended until production ends. For other resources the lease reverts to the government at the end of the primary lease term. The primary lease term varies depending on the resource as shown in Table 2.

It is the clear intent of government to encourage early exploration and development of leases through the imposition of a primary lease term. However, to the extent that lessees alter exploration and production decisions to conform with a primary lease term, economic rent is reduced. For example, suppose that an unconstrained firm (with respect to production timing) would develop a certain lease tract in twelve years and formulates its bid on this basis. The twelve-year period is chosen by the firm because it maximizes the present value of the resource. Next suppose that the same firm is constrained by a five-year primary lease term. The present value of the lease would be reduced. As a consequence, the firm would reformulate its bid, adjusting it downward to take account of the binding time constraint. This problem is heightened if large quantities of land are leased over a short period of time. For example, under the administration of Interior Secretary James Watt, Outer Continental Shelf oil and gas leasing was accelerated. With a five-year primary lease term in effect, this leasing sharply increased the demand for drilling rigs causing exploration costs to rise. These anticipated higher costs were subtracted from expected revenues leading to lower bids. Thus, the cost of encouraging early development is borne by the government itself. Further, resources are misallocated to early production. While the former appears to be merely a redistribution of income, both consequences are social costs reflecting loss of resource value.

These arguments suggest that the primary lease term ought to be eliminated. The sale of mineral rights without a primary lease term is equivalent to privatization because it shifts the timing of resource development from the public sector to the private sector.

There are many reasons to believe that private sector management may be preferable to public sector management. One reason is the incentives facing private managers as opposed to public managers. With wealth maximization as their motive, private managers have a strong incentive to use their resources efficiently. Those managers who obtain the greatest value from their resources and who time the use of their resources optimally are rewarded with maximum wealth. Private decisionmakers who fail to use resources efficiently are held accountable for their actions by a direct reduction in wealth. This is not the case for public sector managers who are not likely to gain personally from efficient decision making or to suffer from mismanagement.

Secondly, public sector decisions governing natural resource use are likely to favor the present relative to the future. The reason for this "shortsightedness" is that politicians must consider the value of their actions in terms of being re-elected. As a consequence, politicians tend to favor those programs which provide near-term visible benefits and

whose costs are in the future and are dispersed throughout the economy.⁷

One explanation for the imposition of a primary lease term is the impatience of politicians to derive political gain from the leasing program. Once the decision has been made to issue natural resource leases, they are eager to see immediate benefits.

Two often-voiced criticisms of privatization are: (1) by removing undeveloped resources from the control of government, the needs of future generations will not be met; and (2) a primary lease term is necessary to avoid "speculative hoarding" of leases by large firms. Ironically the first criticism implies that too much of the resources will be developed today, while the second implies exactly the opposite. Neither of these concerns are economically justified.

Suppose, for example, that natural resources are being depleted too rapidly, the evidence being that their *in situ* values are increasing faster than the opportunity cost of money.⁸ Under such conditions, it is in the interest of wealth maximizing resource owners to save their reserves for future generations by producing less today.

Although markets respond effectively to resource scarcity, it may not be possible politically to eliminate the primary lease term. In our view, any lengthening of the lease term would be desirable. Its total elimination would be ideal. To the extent that the constraint cannot be significantly relaxed, the government collects less of its potential economic rent, and resources are allocated less efficiently between the present and future generations.

Other Lease Requirements Designed to Encourage Diligence

Several special requirements have been adopted to encourage early exploration and development of federal resources. One recent requirement affects coal leases. On December 5, 1986, the Interior Department adopted a new rule prohibiting lessees from obtaining new onshore mineral leases if they have held a coal lease for ten years without production.⁹ An Interior Department official has indicated that as many as 140 leases may fail to meet the new requirement.¹⁰ In reaction to the new requirement, lessees will either accelerate lease development, sell leases to other developers, or surrender leases to the government. If the first option is selected,

7. For further discussion of the arguments favoring privatization see Richard L. Stroup, *In Defense of Asset Management: the Privatization Component*, 5 CONTEMPORARY POLICY ISSUES, at 14-21 (Mar. 1984).

8. *In situ* value is the value of a resource in the ground. It is the market price of a resource less its marginal extraction cost.

9. 51 Fed. Reg. 43,910-43,925 (1986).

10. *U.S. is Expected to Adopt Ruling Limiting Coal Leases*, WALL ST. J., Dec. 5, 1986, at 16.

resource conservation is not served. If the second option is selected, the lease may be acquired by a less efficient producer, and, again, resource conservation is not attained. If lessees ignore the new requirement, although they may be the most efficient producer for a yet to be issued lease, they would be prohibited from bidding. This too would result in an inefficient allocation of resources and a reduction in payments to the government.¹¹

To accelerate the exploration of geothermal leases, lessees are required to make minimum exploration expenditures during the fifth through fifteenth years of the lease.¹² The minimum annual exploration expenditures are shown in Table 3. All exploration expenditures made during the first five years of a lease, and all exploration expenditures during later years above the required minimum are carried forward to meet future minimum expenditure requirements.¹³ When actual exploration expenditures fall short of the minimum requirements, lessees may opt to pay an additional \$3 per acre in rental payments instead of making the required exploration expenditure. Failure to make required exploration expenditures or additional rental payments can result in the loss of the lease.¹⁴

Although this requirement will have the desired effect of stimulating exploration, it is not a wise policy. When a lessee acquires a lease, an exploration plan is formulated. Exploration expenditures are incurred to acquire information about a lease. In the absence of required expenditures,

TABLE 3
Diligent Exploration Expenditures

<i>Lease Year</i>	<i>Expenditure Per Acre</i>
6	4
7	6
8	8
9	10
10	12
11	12
12	12
13	12
14	12
15	12

Source: 43 C.F.R. § 3203.5

11. DAVID F. LINOWES, *Report of the Commission on Fair Market Value for Federal Coal Leasing*, 292-304 (Feb. 1984).

12. 43 C.F.R. § 3203.5.

13. *Id.*

14. *Id.*

additional exploration expenditures are made if the expected value of the benefits of these expenditures exceeds their costs. As more information is collected, the expected benefits of additional exploration are altered. The acquisition of information may encourage or discourage exploration. Required exploration expenditures distort exploration decisions by encouraging early and excessive exploration. As is the case with the primary lease term, to the extent that required expenditures vary from those warranted by present value maximization, the present value of a lease is reduced and lessees will reduce the level of their bids accordingly. Required exploration expenditures should be eliminated.¹⁵

Lessee Diligence and Royalty Payments

Virtually all federal leases require royalty payments. Generally the royalty rate is fixed at the time a lease is issued in accordance with federal law. Royalty payments are calculated as a percentage of gross (not net) product value. Required royalty rates are shown in Table 4. In some

TABLE 4
Royalty Rate by Natural Resource

<i>Resource</i>	<i>Customary Royalty</i>
Asphalt (in Oklahoma)	Not less than \$0.25/ton of marketable production
Coal	8 percent of value aboveground; 12.5% or value underground
Geothermal	10 to 15% of value of steam
Gilsonite	Determined on a case by case basis
Hardrock Minerals*	Determined on a case by case basis
Mineral Materials**	None
Oil and Natural Gas	
Offshore	Determined on a case by case basis (usually 16 ² / ₃ %)
Onshore	
Non-Competitive	12.5%
Competitive	Determined on a case by case basis
Phosphate	Not less than 5% of gross value of output
Potassium	Not less than 2% of gross value of output
Sodium	Not less than 2% of gross value of output
Sulphur	5%
Timber	Determined on a case by case basis

*Hardrock minerals include copper, lead, zinc, manganese, nickel, tungsten, gold, silver, bentonite, barite, feldspar, fluorspar, and uranium.

**Mineral materials include common variety sand and gravel.

Source: Code of Federal Regulations

15. For an extensive description and analysis of federal geothermal leasing procedures see Dennis D. Muraoka and Walter J. Mead, *An Economic Analysis of Federal Geothermal Leasing Procedures*, 26 NAT. RES. J. 675 (1987).

instances, the royalty rate has been used as the bid variable in lease auctions. Such was the case for several offshore leases resulting in royalty rates varying from fifty-two to eighty-two percent. Federal timber from the national forests has traditionally been auctioned using a royalty-like payment called a log scale payment. In these auctions the firms offer bids as dollar payments per thousand board feet of each species to be removed from the forest. Until recently, payment was made when the trees were removed from the forest.

Royalty payments are inconsistent with the goal of early exploration and development. As with rental payments, royalty payments are viewed as costs by the lessees. However, unlike rental payments which can be avoided by speeding production, royalty payments may be delayed, and therefore partly avoided, by delaying production.

The problem of delayed production has been especially troublesome with federal timber sales. In the 1970s, the price of timber rose steadily. Anticipating further increases, timber companies made large bids in the late 1970s and early 1980s. When timber prices collapsed in the early 1980s, many companies were left with federal contracts that could not be completed at a profit. The problem was so widespread that eventually the federal government took special measures to aid the forest products industry. First, the government granted contract extensions. Later, Congress enacted the Federal Timber Contract Modification Act of 1984 (FTCPMA) which enabled distressed firms to "buy-out" up to fifty-five percent of their contracts for pennies on the dollar.¹⁶ The FTCPMA also altered the timing of contract payments. Rather than making payments on a "pay-as-cut" basis, firms are now required to make periodic payments throughout the length of the contract regardless of whether the timber has been harvested.

Thus, while the government has otherwise attempted to encourage early production, its use of royalty payments has actually worked counter to this objective. In addition, royalty payments are viewed by lessees as a marginal cost on each unit of output. As such, they affect output decision making, leading lessees to abandon production prematurely. In the case of minerals, valuable reserves are left in the ground. In the case of timber, logging companies have an incentive to either destroy or abandon logs that have social values greater than social cost. For resource conservation and optimal exploration and development, the optimal royalty rate is zero. It is our recommendation that the government reduce royalty rates as much as politically possible.

Lessee Diligence and Government Regulations

The number of required permits and the extent of government regu-

16. For details see, Dennis D. Muraoka and Richard B. Watson, *Improving the Efficiency of Federal Timber Sale Procedures: An Update*, 26 NAT. RES. J. 69-76 (1986).

lations have greatly increased since the Santa Barbara oil spill in 1969. A variety of federal, state and local permits are now required to explore and develop a lease. Many of the permits and regulations are designed to protect the environment. The rationale for the regulatory and permit process is to avoid or internalize possible external costs that may result from resource development. To the extent that the required permits and regulations result in the internalization of external costs they are desirable. However, required federal, state and local permits may seriously delay the development of a lease, and delays are likely to become longer as more controversial and environmentally sensitive areas are leased. The permit process accords local jurisdictions and political lobbies the opportunity to impose delays, and has been used in this way. All government permits and regulations should be submitted to the rigors of benefit-cost analysis. Those permits and regulations which provide net benefits to society should be retained. The remainder should be eliminated.

SUMMARY AND RECOMMENDATIONS

The federal government has wisely chosen not to develop the vast quantities of natural resources found on public lands itself, but instead has transferred these rights to the private sector. A longstanding objective of the federal government has been to encourage operators of federal leases to act diligently in the development of these resources. Several different policies have been used to accomplish this objective.

Rental payments are required of all mineral and geothermal leases prior to the commencement of production. With the exception of coal leases, rental payments cease when they are exceeded by royalty payments. Although rental payments encourage early production, they reduce the present value of the economic rent that can be derived from federal lands. Furthermore, the payment to the government on competitive leases is reduced when rental payments are required. Rental payments are unnecessary from the perspective of resource conservation and ought to be eliminated.

A feature of many federal natural resource lease contracts is a primary lease term. The primary lease term is the length of time that a lessee is granted the exclusive right to the natural resources found on a tract of federal land. For most resources, federal leases are routinely extended beyond the primary lease term for as long as resources are produced. The primary lease term encourages early production, but like the rental payment, it reduces the economic rent that can be derived from the land and reduces the payment to the government. Ideally, the primary lease term ought to be eliminated.

In addition to rental payments and a primary lease term, special programs have been developed for specific resources. Special diligence re-

quirements are currently in effect for coal and geothermal leases. While these requirements will encourage early development, they do not encourage resource conservation and should be abandoned.

Royalty payments, required permits and regulations have the unintended effect of delaying production. Royalty payments are viewed by lessees as marginal costs that can be avoided by delaying production. For this and other reasons, royalty payments are to be avoided. The permit and regulatory process is designed primarily to internalize externalities. Unfortunately, this process can also be used by special interest groups to delay development. Those permits and regulations that do not result in net benefits to society ought to be eliminated.