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The Center for Energy Studies is a multidisciplinary research center, the central liaison for energy research, education, and public service at The University of Texas at Austin. Dr. Herbert H. Woodson is director.

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Federal Energy Lands: What Is the Price of Faster Leasing?

By Stephen L. McDonald
UT Professor of Economics

(Editor's Note: The following excerpt is adapted from a report by Dr. McDonald entitled National Security and the Rate of Leasing of Federal Lands, *[Center for Energy Studies, Policy Study No. 17]. The study estimates how much domestic petroleum production might be increased by a feasible program of accelerated leasing through the year 2000. Dr. McDonald concludes in his study that accelerated leasing is desirable and feasible and that a long-term plan should be announced immediately. This excerpt deals with the economic and environmental costs of rapidly increasing the leasing rate and how these costs might be minimized.)*

The federal government can increase the rate at which it *offers* its frontier oil areas, principally the Outer Continental Shelf (OCS) and onshore Alaska, for lease to explorers. The rate of leasing, however, may not respond proportionately.

Thus, when the Nixon-Ford administrations accelerated the offering of leases from 1.5 million acres in 1973 to 7.2 million acres in 1975, an increase of 380 percent, land actually leased increased from 1.0 million acres in 1973 to 1.7 million acres in 1975, only 70 percent. Although much depends on the estimated quality of the land offered for lease, several obstacles to increased leasing exist, particularly if the increase in offers is sudden and not fully anticipated.

There is, in general, a long process by which the government and the industry narrow down the amount of potentially leasable land to the acreage actually leased. In ten non-Gulf lease sales in the decade of the seventies, there were 18,704 tracts in the call areas (lands designated by the government as eligible for consideration), of which only 9,593 were nominated by industry.

Of the latter number, only 1,562 tracts were actually offered for lease; and fewer than half of these, 634, received industry bids. After 64 bid rejections, 570 tracts, or 3.0 percent of the call area, were actually leased. The percentage of the call area actually leased in four Gulf of Mexico sales in the same period was even lower (as might be expected in a relatively mature province).

How Bidding and Leasing Work

This process can be summarized as follows. The government selects an area of general geological suitability. On the basis of predrilling exploration and analysis (and the desire to keep secret from

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competitors the primary areas of interest), members of the industry nominate specific tracts for offer. Depending on the interest indicated by nominations, the government tentatively selects tracts to be offered. Some of these are withdrawn for reasons of environmental risk or possible conflict with other land uses; the remaining tracts are offered for lease.

Members of the industry bid on those tracts in which they have sufficient interest. Some of the high bids are rejected as below the government's own evaluation or as insufficiently competitive (too few bidders). The remaining tracts are actually leased.

Obstacles to a Fast Rate of Leasing

This account of the process suggests the major obstacles to accelerating leasing in step with tract offering. The principal factor is the ability of the industry, well in advance of the lease sale, to perform sufficient predrilling exploration and analysis to identify and evaluate those tracts of commercial promise. Such preliminary activity helps to determine nominations, tracts bid upon, and the competitiveness of bids. The sufficiency of the activity depends upon adequate lead time between designation of a likely call area and the actual casting of bids; it also depends upon the availability of the necessary personnel and equipment. Neither the quantity nor the skill of personnel (e.g., geologists and geophysicists) can be increased overnight. There is presently a shortage of geologists, petroleum engineers, and skilled drilling personnel. This shortage would be an obstacle to a sudden, sharp increase in leasing.

Similarly, on the side of the government, the availability of skilled personnel limits the amount of land that can be selected for possible lease, studied for environmental risk, and evaluated to assure receipt of fair market value where bids are few.

Another factor is the availability of drilling rigs, transportation equipment, and oil well services (e.g., mud and logging). Firms will not bid for tracts of land, of course, unless they can expect to commence drilling within the primary term of leases (five years on the OCS); and it does no good to lease land more rapidly with, say, an extended primary lease term if production cannot be established on a similar schedule.

Finally, in frontier areas environmental studies are likely to be longer and more difficult; litigation over environmental matters is more likely to delay the ultimate selection of tracts to be offered for lease. On the OCS, the environmental impact statement requirement accounts for about two-thirds of the prelease planning time and is the principal reason for the withdrawal of tracts from lease offerings.

PROPOSED STREAMLINING OF FEDERAL LEASING PROCEDURES

Current	Proposed
1. Call for tract nomination in a sale area	1. Designation of a large planning area (e.g., basin)
2. Tentative selection of tracts	2. Call for information (as to hydrocarbon potential, environmental problems, etc.)
3. Preparation of a tract-related environmental impact statement	3. Preparation of area-wide environmental impact statement
4. Public hearings and comments	4. Public hearings and comments
5. Final selection of tracts	5. Final designation of sale area
6. Economic evaluation of tracts by Interior Department	6. Receipt of bids
7. Receipt of bids	7. Awards of leases to high bidder for tracts with three or more bids
8. Evaluation of bids for fair market value	8. Evaluation of other high bids for acceptance or rejection
9. Award of leases for acceptable bids	

Reducing the Obstacles

There are, of course, things that can be done to lessen these obstacles to accelerated leasing. First, the long-term plan of leasing — the total acreage per year, the specific areas involved, and the order of their offering — should be announced as soon as possible. Second, there should be a gradual acceleration of lease offerings during a transition period of, say five years.

Third, the target high level of offerings, once reached, should be sustained for a long enough period of time to warrant an appropriate increase in the capacity of the industries involved — steel, rigs, oil well service, transportation, and personnel training. Thus, in a "fast" leasing strategy [detailed in the report], the rate of leasing would gradually increase to 1985 and thereafter the rate would be sustained at 14 million acres per year for twenty years.

Fourth, environmental impact studies should cover broad areas of interest, not just the tracts selected tentatively for offer in a particular sale; and they should be undertaken as soon as an area of interest is scheduled for processing. Thus, one study may satisfy the requirements of a number of individual sales.

The US Department of the Interior has recently issued a proposal for streamlining leasing procedures. The current procedures and the proposed ones are compared in the accompanying box. These proposed procedures incorporate my fourth recommendation above and would rely more on competitive bids to assure receipt of fair market value than on independent government evaluations. I believe that, in combination with the first three points above, the Interior Department's proposal is a good one.

Minimizing Costs of Accelerated Leasing: Loss of Economic Rent

If leasing is accelerated too rapidly, the industry will perform predrilling exploration and analysis less thoroughly than is optimal. Bidding firms will face more uncertainty on given tracts, and fewer firms will bid on given tracts. With greater uncertainty and less competitive bidding, the government will tend to receive less economic rent (compensation) than is otherwise available.

Except as it may be associated with failure to detect some deposits of oil, this in itself is not a social cost. It represents a transfer from government to industry. But indirectly there may be a social cost. Economic rent is a surplus which can be extracted from the industry without affecting incentives and the margin of exploitation. The receipts of rent by the government substitute for taxes that otherwise would have to be levied, taxes which in general would affect incentives and margins of activity. To the extent that the government receives less rent and levies more taxes, the economy is made less productive. This is the social cost, of course.

How can we minimize this cost while accelerating the offering of lands for lease? To some extent, my proposal to announce a leasing program well in advance and to accelerate land offerings gradually will deal with this problem. Beyond that, we can alter the typical leasing system:

In the past nearly all federal OCS leases have been granted on the basis of a lease bonus bid, a lump-sum bid for the privilege of exploring. In some respects, this is the ideal way to capture economic rent; the lease bonus is relatively neutral with respect to development, production, and abandonment decisions. But it maximizes front-end capital requirements and locates the burden of uncertainty on the prospective lessee. It may be associated with loss of economic rent, largely because of uncertainty, under accelerated offering of lands for lease.

A second-best alternative, which greatly eases the uncertainty problem, is the granting of leases on the basis of a profit share bid, a bid that promises the government a certain percentage of the profits, if any, in return for exploratory privilege. Recent amendments to the law specifically allow profit share bidding as an alternative to bonus bidding. This alternative may be usefully employed, particularly in the acceleration phase of the "fast" leasing plan.

Minimizing Environmental Damage

One of the difficult problems in handling environmental costs is how to compensate those who experience damages, despite the controls imposed on the producing industry that are designed to prevent them. It is fear of uncompensated damages that leads groups like beach-side communities or a localized fishing industry to resist the siting of oil activities in their areas.

Much resistance and litigation, which slow the leasing of federal lands, could be avoided if such groups could be compensated with unconditional payments in contemplation of possible damages. Payments to a community government could substitute for taxes, thus benefiting all members of the community. It would not matter whether the payment was made by the industry or by the government as lessor. With the world price determined by OPEC, the burden of payments made by the industry would take the form of reduced rents to the government. The latter might as well make the payments out of rent receipts. Such payments by the government should be regarded as national defense expenditures, the burden of which rightly falls on the nation as a whole. A system of payments to communities or groups at risk might well facilitate and support a program of accelerated leasing.

CES Update

Electric Power

Demand for electricity is expected to go up in the future, but how much and at what rate, nobody knows. CES Electric Power Division researchers hope to provide some more precise answers to those questions in a project that deals with **computer modeling of electricity demand.**

Models that project future demand trends for electricity are a chief tool used by the electric power industry in long-range planning. In this project, conducted by electrical engineering graduate student Vewiser Turner, Jr., and supervised by Dr. Martin L. Baughman, head of the Electric Power Division, two demand models are being compared and contrasted. The two models are the demand submodel of the Regionalized Electricity Model (REM), developed by Dr. Baughman and Dr. Paul Joskow of MIT, and the State-Level Energy Demand model (SLED), developed by Oak Ridge National Laboratory.

Mr. Turner said he is analyzing an independent version of the REM demand submodel, updating it and integrating a state-by-state data base of actual 1977 energy data. He is developing a series of electricity demand scenarios for the model that involve different combinations of low, medium, and high rates for (1) economic growth, (2) electricity price escalation, and (3) oil and gas price escalation. For each scenario, the REM demand submodel will project a demand trend for the period 1980-2000.

The SLED model is a similiar econometric model that contains a 1976 data base. Mr. Turner said he has modified the growth projections of SLED so that the demand projections of the two models can be compared. Different demand trends, particularly for the residential and commercial sectors, have emerged. Mr. Turner said he hopes to learn a great deal about the range and nature of electricity demand projected by the two models.

Environmental Studies

Dr. Joseph F. Malina, Jr., head of the Environmental Studies Division and chairman of the UT Department of Civil Engineering, has been appointed director of the Texas Water Pollution Control Association.

Nuclear Studies

A study of the fission products created in the blanket of a **hybrid fission-fusion nuclear reactor** is under way within the Nuclear Studies Division.

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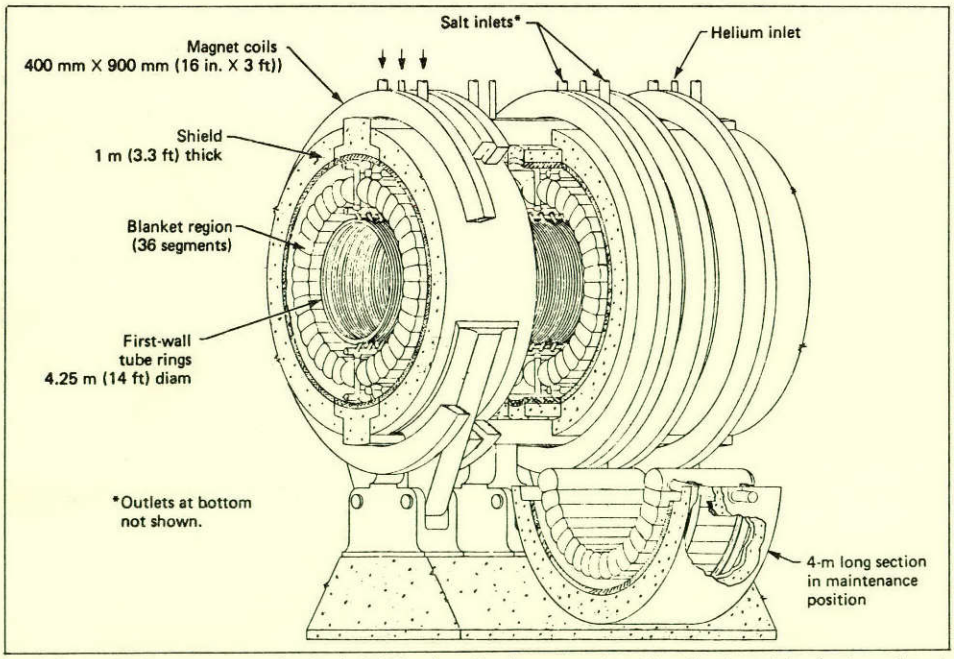
Hybrid fission-fusion reactors are being studied today because they hold promise as a cost-effective approach to the first commercial use of fusion power, said Dr. Wiley Davidson, Nuclear Division researcher. He is working on the project with mechanical engineering graduate student Ann Patterson.

In the hybrid design a blanket zone of molten salt would surround the fusion plasma. If the blanket also contained fertile material, it could be used to breed nuclear fuel, the fusion plasma providing the necessary neutron source (see diagram). In the breeding process, however, undesirable fission products would build up along with the nuclear fuel. The fission products tend to absorb neutrons and would hamper the breeding process, Dr. Davidson said.

Both the nuclear fuel and the fission products would be extracted from the blanket by chemical processing. The focus of the current study is on comparing the various fission products, their rates of accumulation, their capacities to absorb neutrons, and the overall efficiencies of different methods of chemical processing.

The research is supported by a grant from the Texas Atomic Energy Research Foundation.



In this artist's concept of a hybrid fission-fusion reactor, the fission blanket region is contained between the first-wall and the shield layers. The innermost layer is the plasma zone. The complete vessel, of which four modules are here displayed, is a hybrid tandem-mirror reactor. (Source: Lawrence Livermore Lab)

Services

The **Energy Information Service** of the Center for Energy Studies is now open on a full-time basis 8 a.m. to noon and 1 to 5 p.m. Monday through Friday.

The collection is located in room 140 of the Engineering-Science Building on the UT-Austin campus and includes about 30,000 energy-related titles, said EIS research associate Carol Wallin. The three main types of holdings are periodicals, government research reports in microfiche form, and shelf holdings.

The shelf categories are: coal, conservation, electric power, general, environmental, geothermal, nuclear, hydrogen, solid waste, energy storage, natural gas, petroleum, solar (wind, biomass, ocean), reserve, and reference.

Two new items have recently been added to the Energy Information Service:

- The *TENRAC Clipping Service,* a daily compilation of energy-related trends and events as reported in major Texas newspapers, the *Wall Street Journal, Energy Daily,* and other publications (published by the Texas Energy and Natural Resources Advisory Council).
- CES Energy Clippings File, a 166-category file of energy-related clippings from the *Austin American-Statesman* and *The Daily Texan,* 1977 to the present.

All those who fill out an EIS user's card may check out materials from the Energy Information Service, except reference items.