



November 2020

OIL AND GAS

Onshore Competitive and Noncompetitive Lease Revenues

Accessible Version

GAO Highlights

Highlights of [GAO-21-138](#), a report to congressional requesters

Why GAO Did This Study

According to BLM, federal onshore oil and gas leases generate about \$3 billion annually in federal revenues, including royalties, one-time bonus bid payments, and rents. The Federal Onshore Oil and Gas Leasing Reform Act of 1987 requires that public lands available for oil and gas leasing first be offered under a competitive bidding process. BLM offers leases with 10-year primary terms competitively through auction or, if the tract of land does not receive an adequate bid, noncompetitively for a fee. The minimum bid is \$2 per acre, and bids at or above the minimum are called bonus bids.

ONRR is to collect revenues from oil and gas leases in accordance with the specific terms and conditions outlined in the leases, including revenues from rents and royalties. Lessees are to pay rent annually until production begins on the leased land and then pay royalties as a percentage of oil and gas production. Lease terms may be extended beyond the primary term if, for example, the lease is producing oil or gas.

GAO was asked to review oil and gas leasing on federal lands. This report describes oil and gas revenues from competitive and noncompetitive leases for fiscal years 2003 through 2019.

GAO analyzed federal lease and revenue data and interviewed Interior officials and four experts knowledgeable about federal oil and gas leasing. To consistently compare leases over their lifecycle, GAO analyzed revenues that occurred within the leases' primary term (first 10 years) for leases that started in fiscal years 2003 through 2009.

View [GAO-21-138](#). For more information, contact Frank Rusco at (202) 512-3841 or RuscoF@gao.gov.

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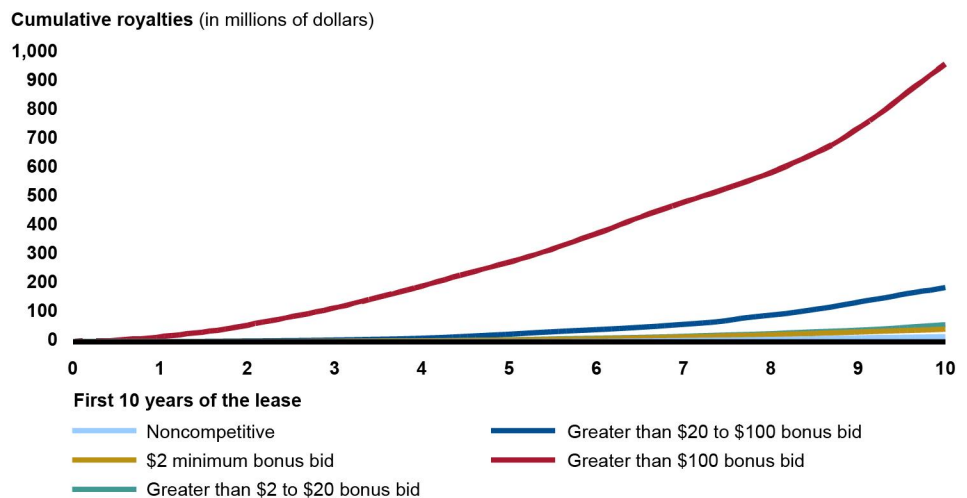
Onshore Competitive and Noncompetitive Lease Revenues

What GAO Found

Pursuant to federal law, the Department of the Interior's (Interior) Bureau of Land Management (BLM) offers leases competitively through auction or noncompetitively for a fee if an adequate bid is not received. Competitive leases for oil and gas development on federal lands produced greater revenues, on average, than noncompetitive leases for fiscal years 2003 through 2019, according to GAO's analysis of revenues reported by Interior's Office of Natural Resources Revenue (ONRR) and leases from BLM. For this period, about 72,800 competitive leases produced about \$14.3 billion in revenues—while total of 100,300 leases produced \$16.1 billion. Average revenues from competitive leases over this time period were nearly 3 times greater than revenues from noncompetitive leases; about \$196,000 and \$66,000, respectively.

Based on GAO's analysis of leases that started in fiscal years 2003 through 2009, competitive leases produced oil and gas more often than noncompetitive leases during the leases' 10-year primary term. Further, competitive leases with high bonus bids (bids above \$100 per acre) were more likely to produce oil and gas in their 10-year primary terms than both competitive leases with lower bonus bids and noncompetitive leases. Specifically, about 26 percent of competitive leases that sold with bonus bids above \$100 per acre produced oil and gas and generated royalties in their primary term compared with about 2 percent for competitive leases that sold at the minimum bid of \$2 per acre and about 1 percent for noncompetitive leases. GAO's analysis showed that competitive leases with high bonus bids generated over 3 times the amount of cumulative, or total, royalties by the end of their primary term than all other competitive and noncompetitive leases combined (see fig.).

Cumulative Royalties from Competitive Leases, by Bonus Bid, and Noncompetitive Leases That Started in Fiscal Years 2003 through 2009



Source: GAO analysis of Bureau of Land Management and Office of Natural Resources Revenue data. | GAO-21-138

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Abbreviations

BLM	Bureau of Land Management
Interior	Department of the Interior
LR2000	Legacy Rehost System 2000
MRMSS	Minerals Revenue Management Support System
1987 Reform Act	Federal Onshore Oil and Gas Leasing Reform Act of 1987
ONRR	Office of Natural Resources Revenue

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November 19, 2020

The Honorable Raúl M. Grijalva
Chairman
Committee on Natural Resources
House of Representatives

The Honorable Alan S. Lowenthal
Chairman
Subcommittee on Energy and Mineral Resources
Committee on Natural Resources
House of Representatives

The production of oil and natural gas from leases on federal lands is a significant source of revenue for the federal government.¹ According to the Department of the Interior's (Interior) Bureau of Land Management (BLM), federal onshore oil and gas leases generate about \$3 billion annually in federal revenues, including royalties, one-time bonus bid payments, and rents. As the bureau responsible for managing the federal government's onshore oil and gas program, BLM leases federal lands through both competitive and noncompetitive processes established by the Federal Onshore Oil and Gas Leasing Reform Act of 1987 (1987 Reform Act).² These processes include auctions that are open to the public. If BLM receives bids on parcels of land at or above the minimum acceptable bid—called bonus bids—the agency awards the lease to the highest bidder; such leases are called competitive leases.³ Tracts of land that do not receive a bid at auction are made available noncompetitively

¹The federal government generally shares approximately half of this revenue with the states in which the oil and natural gas was produced.

²BLM's current leasing processes were established under the Mineral Leasing Act of 1920, as amended. The 1987 Reform Act amended the Mineral Leasing Act of 1920. The focus of this report is on federal onshore oil and gas leasing. It does not address offshore leases. For more information on offshore leasing, see GAO, *Offshore Oil and Gas: Opportunities Exist to Better Ensure a Fair Return on Federal Resources*, [GAO-19-531](#) (Washington, D.C.: Sept. 25, 2019).

³BLM is required to accept the highest bid received that exceeds the minimum bid value of \$2 per acre or fraction thereof. 30 U.S.C. § 226(b)(1).

for a period of 2 years on a first-come, first-served basis; such leases are called noncompetitive leases.⁴

Interior's Office of Natural Resources Revenue (ONRR) collects revenues from oil and gas leases under the specific terms and conditions established in each lease. During the primary lease term, which is generally 10 years, operators pay annual rents until production begins on the leased land.⁵ Operators also pay royalties based on the amount of oil and gas produced under the lease. According to BLM, lease terms may be extended beyond the primary term when oil or gas is produced in paying quantities, among other instances.⁶ In general, a lease remains in effect so long as the operator continues to produce oil or gas in paying quantities.⁷

In February 2011, we added Interior's management of federal oil and gas resources to our list of programs at high risk for fraud, waste, abuse, and mismanagement due to Interior's challenges regarding royalty

⁴30 U.S.C. § 226(b)(1)(A), (c); 43 C.F.R. §§ 3110.1(b), 3110.2.

⁵A lease can be terminated or cancelled before the 10-year term ends. For the purposes of this report, we refer to oil and gas companies that obtain competitive and noncompetitive leases as operators.

⁶According to BLM regulations, production in paying quantities means production of oil or gas of sufficient value to exceed direct operating costs and the cost of lease rentals or minimum royalties. However, these BLM regulations do not address what costs may be deducted for the purposes of royalty payment calculations. In addition, BLM issued national emergency guidance for suspending onshore oil and gas leases (i.e., placing leases on hold) and reducing required royalty payment amounts, due to the effects of Coronavirus Disease 2019 (COVID-19) on operations or production. The effect of lease suspensions and royalty rate reductions due to COVID-19 is outside the scope of this review. For more information on the effects of royalty rate reductions, see GAO, *Federal Oil and Gas Revenue: Actions Needed to Improve BLM's Royalty Relief Policy*, [GAO-21-169T](#) (Washington, D.C.: Oct. 6, 2020).

⁷30 U.S.C. § 226(e); 43 C.F.R. § 3107.2-1. BLM regulations also provide that leases shall not expire if they contain a well capable of production, unless BLM directs the operator to put those leases in production and the operator fails to do so within the period specified. 43 C.F.R. § 3107.2-3. Leases may still be in effect without producing wells, such as when a lease has wells that are not producing but can still physically and mechanically operate without additional equipment (i.e., shut-in wells). A lease may also be in effect but be suspended due to, for example, permit issues or environmental reviews. For more information on shut-in and other nonproducing wells, see GAO, *Oil and Gas Wells: Bureau of Land Management Needs to Improve Its Data and Oversight of Its Potential Liabilities*, [GAO-18-250](#) (Washington, D.C.: May 16, 2018). For more information on lease suspensions, see GAO, *Oil and Gas Lease Management: BLM Could Improve Oversight of Lease Suspensions with Better Data and Monitoring Procedures*, [GAO-18-411](#) (Washington, D.C.: June 4, 2018).

determination and collection, human capital, and the restructuring of offshore oil and gas oversight.⁸

You asked us to review oil and gas leasing on federal lands. This report describes oil and gas revenues from competitive and noncompetitive leases on federal lands for fiscal years 2003 through 2019.

To describe oil and gas revenues from competitive and noncompetitive leases for fiscal years 2003 through 2019, we obtained lease data from BLM's database for mineral and land use—Legacy Rehost System 2000 (LR2000)—and revenue data from ONRR's Minerals Revenue Management Support System (MRMSS). LR2000 contains information on lease characteristics, such as lease acreage, lease effective (or start) dates, and lease case types (i.e., lease types). To identify competitive and noncompetitive leases, we used LR2000 case types to classify groups of leases sold through the 1987 Reform Act process.⁹ MRMSS contains information on revenue amounts, revenue types (e.g., royalties, rents, and bonus bids), commodities produced (e.g., oil and gas), and the dates operators reported revenues and sold products that generated royalties.¹⁰ We standardized information to combine revenues reported in two different data sets: the ONRR-2014 and ONRR Direct Billed data. We then aggregated the revenues to a unit of analysis defined by lease, month, revenue type, and commodity. To link information on leases characteristics to revenues, we developed a method to match leases in LR2000 and MRMSS data.¹¹

⁸GAO, *High Risk Series: An Update*, [GAO-11-278](#) (Washington, D.C.: Feb. 16, 2011).

⁹We used BLM's Oil and Gas LR2000 Desk Reference Guide to classify leases as competitive or noncompetitive based on post-1987 Reform Act case type codes. We classified the remaining leases in BLM's Desk Reference Guide as "other." While competitive and noncompetitive leases existed before 1987, the 1987 Reform Act changed how BLM offered those lease types for sale. For the purposes of this report, we limit our definition of competitive and noncompetitive leases to those that were sold through the 1987 Reform Act process.

¹⁰Where possible, we relied on ONRR's variable definitions that it uses for its publicly available data when using ONRR MRMSS revenue data. ONRR provided underlying tables for creating the variables presented in its publications. The revenue data we received from ONRR reflect the amount operators reported to ONRR MRMSS and not the amount that the federal government collected. The variable revenue type also includes a category for other revenues. The commodity category for gas includes natural gas and natural gas liquids.

¹¹For more information on our linking process, please see app. I.

We limited our scope to federal onshore oil and gas leases and the revenues they produced from fiscal years 2003 through 2019.¹² We further restricted our analysis to competitive and noncompetitive leases.¹³ With this scope, we reviewed leases that started in December 1986 through September 2019, and we reviewed revenues for fiscal years 2003 through 2019. As a result, we cannot report all revenue data for all leases. To compare how leases performed in terms of revenue, we further restricted our subsequent analyses to primary-term revenues for leases that started in fiscal years 2003 through 2009.¹⁴ To describe the relationship between bonus bids and primary-term revenues, we calculated bonus bid per acre by dividing each lease's bonus bid revenue by its acreage.¹⁵ We then grouped competitive leases into four categories based on leases that had bonus bids per acre that were equal to \$2, greater than \$2 to \$20, greater than \$20 to \$100, and greater than \$100.¹⁶ We compared total primary-term rents, royalties, and bonus bid amounts for each competitive lease bonus bid group and noncompetitive

¹²We limited our analysis to revenues reported for fiscal years 2003 through 2019 because we determined that ONRR MRMSS data were reliable for that time frame. We considered LR2000 leases with case type codes listed in BLM's Desk Reference Guide to be federal onshore oil and gas leases. We identified ONRR revenues for federal onshore oil and gas leases based on information in MRMSS about mineral type (oil and gas leases), land class (federal), and land category (onshore). In addition, we restricted revenues to oil, gas, and natural gas liquids. We also excluded leases in Alaska, since BLM does not record these leases in LR2000.

¹³Our analysis included 72,746 competitive and 27,535 noncompetitive leases and excluded 209,989 leases we defined as other. The majority (about 93 percent) of leases in the category of other included leases sold through processes that predate the 1987 Reform Act. Our other lease category also included renewal and exchange leases; private leases acquired with federal land acquisition; and leases sold through Special Acts, such as rights of way, units of the National Parks System, General Service Administration surplus lands, and Naval oil shale reserves. Since we focused on leases sold through the 1987 Reform Act process, our report defines competitive and noncompetitive leases more narrowly than BLM.

¹⁴We defined the lease primary term as a 10-year period following a lease start date, calculated based on the lease effective (start) date from LR2000 and either the date products were sold (royalties) or the date revenues were recorded in MRMSS (rents and bonus bids).

¹⁵We rounded up acreage to the next-highest integer to reflect BLM lease sale bidding rules for minimum bids, and bid increments.

¹⁶To create a bonus bid distribution, we rank-ordered competitive leases that started from fiscal years 2003 through 2009 by the bonus bid per acre amount and then broke them into four roughly even groups, or quartiles. Noncompetitive leases had a similar frequency as the categories of bonus bid amounts for competitive leases.

leases. In addition, we calculated metrics on the likelihood, timing, and amount of royalties during each lease's primary term.

We assessed the reliability of BLM's LR2000 data and ONRR MRMS data by (1) performing electronic testing, (2) reviewing existing information about the data and the system that produced them, and (3) interviewing agency officials knowledgeable about the data. We determined that the data were sufficiently reliable for the purposes of this report. We also interviewed four experts who are academics and former government employees who are knowledgeable about federal oil and gas leasing. We interviewed these experts to obtain supplemental information on federal oil and gas leasing, specifically any differences between the competitive and noncompetitive leasing process and resulting revenues. We identified potential experts based on two literature searches and through recommendations from experts we initially contacted. We selected the experts based on their experience working with lease-level BLM and ONRR data, their published work related to federal onshore oil and gas leasing, and time and resource considerations. We may not have identified all experts or researchers with a view on this topic or who have done work in this area, and the views of the experts we spoke with cannot be generalized to experts we did not interview. A more detailed discussion of our scope and methodology is presented in appendix I.

We conducted this performance audit from June 2018 to November 2020, in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

Federal Responsibilities for Oil and Gas Leasing and Associated Revenues

BLM and ONRR each have responsibilities for managing federal oil and gas leases and the revenues generated by these leases. BLM is responsible for managing the federal government's oil and gas program, including lease sales and collecting initial revenue from those sales. ONRR manages the collection and disbursement of remaining revenues

associated with leased oil and gas parcels, including bonus bids, rents, and royalties.¹⁷

BLM and ONRR have responsibilities for collecting, maintaining, and reporting data on federal oil and gas leases. Specifically, BLM collects information on the administration of leases, and ONRR collects information on revenues generated by these leases, as follows:

- BLM records information in its LR2000 database on leases in effect, as well as leases that closed after 1988, according to BLM officials. LR2000 contains information on lease locations, lease start dates, lessees, and whether leases are competitive or noncompetitive, among other things. BLM also publicly reports statistics on the number of parcels of land and total acres leased each year, as well as the total number of leases and total acreage for competitive and noncompetitive leased parcels.
- ONRR collects and maintains revenue data for oil and gas leases in MRMSS. ONRR maintains all royalty and nonroyalty revenue—including bonus bids, rents, and administrative fees—in ONRR MRMSS. ONRR also publicly reports summary statistics on bonus bids, rents, royalties, and other revenues, such as fees, which ONRR officials told us were based on the data maintained in ONRR MRMSS.

BLM Processes for Issuing Leases for Oil and Gas Development on Federal Lands

The 1987 Reform Act changed BLM's processes for issuing and administering competitive and noncompetitive leases to develop oil and gas on federal lands.¹⁸ Prior to the 1987 Reform Act, the Mineral Leasing Act of 1920, as amended, required BLM to evaluate federal lands based on their potential for producing oil and gas. When BLM determined that lands were within known geologic structures indicative of potential oil and gas resources, the Mineral Leasing Act required BLM to auction such

¹⁷In 2010, Interior created ONRR as part of a reorganization.

¹⁸In addition to the leasing process we describe, there are other processes under the Mineral Leasing Act of 1920 for specific categories of onshore leasing of federal lands and minerals, such as for oil shale. These other processes are outside the scope of our review.

lands competitively to the highest bidder.¹⁹ BLM currently follows a process whereby industry representatives and other members of the public submit expressions of interest to nominate parcels of land they wish to be considered for competitive sale through public auctions. In auctions held by BLM state offices, BLM may offer for sale nominated parcels that meet established criteria, such as those having been deemed eligible in the process of an environmental review.²⁰ In these auctions, federal land parcels are first offered for competitive lease. If BLM receives a bid that is at or above the statutorily established minimum acceptable bid amount of \$2 an acre, BLM awards the lease to the highest bidder.²¹ Parcels of land that do not receive an adequate bid at auction are made available noncompetitively the next business day, for a period of 2 years, on a first-come, first-served basis.²²

Operators that obtain either competitive or noncompetitive leases are granted exclusive rights to explore, develop, produce, and sell oil and gas from leased lands, and the federal government collects revenues, under specified terms and conditions for the lease. (See fig. 1.) In addition to

¹⁹Prior to the 1987 Reform Act, BLM compared the highest sealed bid for each lease to its own minimum acceptable bid, which BLM calculated for each lease based on a variety of economic variables, including the expected amount of oil and gas in the area. If the highest bid equaled or exceeded BLM's minimum acceptable bid, BLM issued the lease; if not, BLM rejected the bid and could reoffer the lease in a subsequent competitive lease sale. For federal lands that the agency determined were not within a known geologic structure, BLM leased these lands noncompetitively. According to our prior work, before the 1987 Reform Act, more than 95 percent of onshore leases were issued noncompetitively. See GAO, *Mineral Revenues: Implementation of the Federal Onshore Oil and Gas Leasing Reform Act of 1987*, [GAO/RCED-89-108](#) (Washington, D.C.: May 8, 1989).

²⁰BLM has 12 state offices that oversee oil and gas leasing on federal onshore lands. These state offices are Alaska, Arizona, California, Colorado, Eastern States, Idaho, Montana-Dakotas, Nevada, New Mexico, Oregon-Washington, Utah, and Wyoming. For the purposes of our review, we did not include information on leasing in Alaska because, according to BLM officials, the BLM Alaska state office conducts leasing in a different manner than other BLM state offices.

²¹The minimum bonus bid is a floor set by statute, as are other lease terms, such as the rental rate, which BLM can increase by promulgating a regulation.

²²43 C.F.R. § 3110.1(b); 43 C.F.R. § 3110.2. For parcels made available for noncompetitive leasing, the parcel must maintain parcel integrity (i.e., the exact acreage and configuration beginning the first business day following the end of an auction and continuing through the remainder of that same month). After the parcel integrity time period, operators may make a noncompetitive lease offer on all or part of the parcel or may make an offer that combines multiple parcels into a single noncompetitive lease if the lease offer meets regulatory requirements for parcel size and description.

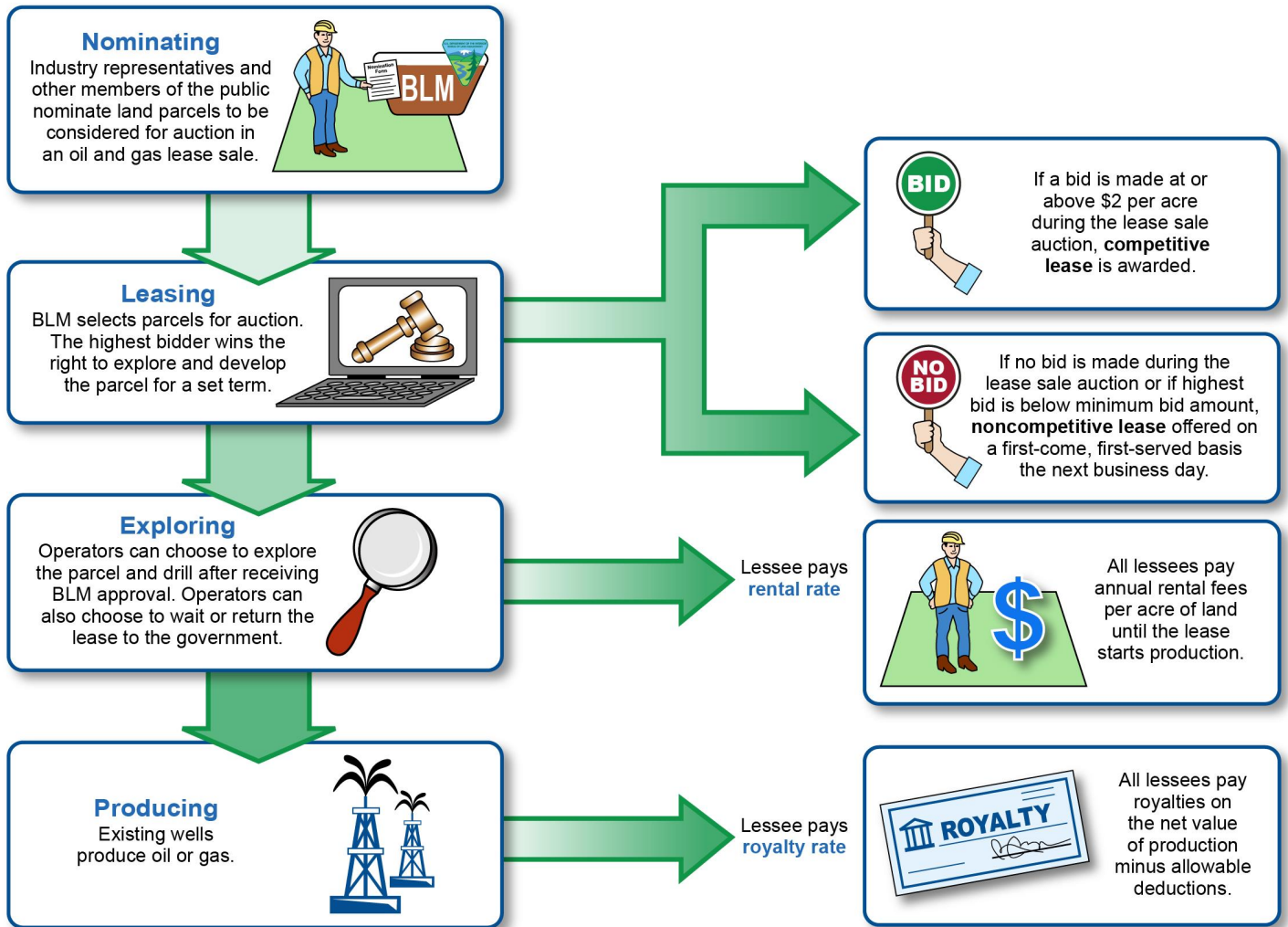
collecting the highest bonus bid for competitive leases sold at auction, the government also collects annual rents, royalties, and administrative fees:

- **Rents.** Operators pay rent annually at a fixed rate until production begins on the leased land or, if no production occurs, until the end of the period specified in the lease. For federal onshore oil and gas leases, the rental rate is generally \$1.50 per acre for the first 5 years and \$2 per acre each year thereafter.²³
- **Royalties.** Once production of oil or gas in paying quantities starts on a lease, operators pay the federal government royalties of at least 12.5 percent of the net value of production removed or sold from the lease minus allowable deductions for the transportation costs of oil or gas or processing costs for gas.²⁴ Oil and gas parcels are generally leased for a primary term of 10 years, but lease terms may be extended if, for example, the lease is producing oil or gas, among other reasons.
- **Administrative fees.** Operators pay a one-time administrative fee for both competitive and noncompetitive leases.

²³43 C.F.R. § 3103.2-2(a).

²⁴Until January 2017, BLM regulations generally established a fixed royalty rate of 12.5 percent. BLM, "Minerals Management; General Oil and Gas Leasing; Noncompetitive Leases: Competitive Leases: Oil and Gas Leasing—National Petroleum Reserve—Alaska: Onshore Oil and Gas Operations: Onshore Oil and Gas Unit Agreements—Unproven Areas: Geothermal Resources Leasing; General: Geothermal Resources Unit Agreements—Unproven Areas; final rule," 53 Fed. Reg. 22814, 22838 (June 17, 1988) (revised § 3103.3-1). In November 2016, BLM issued regulations amending this section to mirror BLM's statutory authority for competitive leases, providing BLM with the flexibility to set royalty rates at or above 12.5 percent. This rule became effective in January 2017. Department of the Interior, Bureau of Land Management, *Waste Prevention, Production Subject to Royalties, and Resource Conservation*, Final Rule, 81 Fed. Reg. 83008 (Nov. 18, 2016). The portion of the 2016 rule that addresses the royalty rate authority is outside the scope of the 2018 rescission or revision rule and outside the litigation over that 2018 rule. The spring 2020 BLM emergency guidance related to COVID-19 states that royalty rates may be temporarily reduced to no lower than 0.5 percent.

Figure 1: Process for Federal Oil and Gas Leases and Associated Revenues



BLM = Bureau of Land Management

Source: GAO Analysis of BLM Information. | GAO-21-138

According to BLM data, by the end of fiscal year 2019, BLM had sold 310,270 federal oil and gas leases that totaled about 324 million acres across 40 states.²⁵ Of the 310,270 leases, 72,746 were competitive, and

²⁵The number of leases include all federal oil and gas leases historically in LR2000, including other leases that for purposes of this report we do not define as competitive or noncompetitive. According to BLM officials, BLM underwent an automation effort in the 1980s and entered information on all leases that were active at the time into the newly created LR2000 database. According to officials, oil and gas leases that were closed prior to 1984 were not added and are not captured in LR2000.

27,535 were noncompetitive leases. These roughly 100,000 competitive and noncompetitive leases cover about 89 million acres across the United States, primarily across western states, according to BLM data. There were more competitive leases than noncompetitive leases in the majority of BLM state office administrative boundaries, with the exception of the Arizona and Nevada state offices.

Competitive Leases Sold at High Bonus Bids Had Greater Revenues than Other Competitive and Noncompetitive Leases

Competitive oil and gas leases on federal lands produced greater revenues on average than noncompetitive leases and represented 89 percent of oil and gas revenues reported by the federal government for the leases we analyzed for fiscal years 2003 through 2019.²⁶ In addition, for leases that started in selected years, competitive leases with high bonus bids—above \$100 per acre—represented a small portion of the total number of competitive and noncompetitive leases (about 17 percent) but accounted for the majority of revenues (about 74 percent) during the 10-year primary lease term.²⁷ Further, competitive leases with high bonus bids were more likely to produce oil and gas and began producing earlier

²⁶We limited our analysis to competitive and noncompetitive leases and revenues reported for fiscal years 2003 through 2019 because we determined that ONRR revenue data for that time frame were reliable. We matched BLM's lease data with ONRR's revenue data to identify which of these leases—some of which started decades ago—had revenues for fiscal years 2003 through 2019. The revenue data we received from ONRR reflect the amount operators reported to ONRR and not the amount collected by the federal government. We refer to leases' reported revenues as revenues that leases produced. Because of the differences in the coverage of our lease and revenue data, we did not analyze all revenue information for all leases we reviewed. For example, we did not have bonus bid information for leases that started in the 1990s because we do not have revenue data prior to fiscal year 2003. For more information about our methodology for matching and analyzing lease and revenue data, please see app. I.

²⁷We analyzed competitive leases with different bonus bids as well as noncompetitive leases that started in fiscal years 2003 through 2009. To capture revenues during the primary lease term, which is the first 10 years, we limited our analysis to leases that started in fiscal years 2003 through 2009. For example, a lease that started in fiscal year 2009 would have a primary lease term that ended in fiscal year 2019, the last year for which MRMS data were available. For more information, see app. I.

in their 10-year primary term than other competitive and noncompetitive leases, according to our analysis.²⁸

Competitive Leases Produced Greater Revenues on Average than Noncompetitive Leases for Fiscal Years 2003 through 2019

Competitive onshore oil and gas leases produced greater revenues on average than noncompetitive leases for fiscal years 2003 through 2019, based on our analysis of about 100,300 competitive and noncompetitive onshore leases.²⁹ Specifically, we found that competitive leases comprised about 89 percent of competitive and noncompetitive lease revenues (about \$14.3 billion of \$16.1 billion) (see table 1),³⁰ while competitive leases comprised about 73 percent of competitive and noncompetitive leases (about 72,800 of 100,300 leases) and about 62 percent of total acreage.³¹

²⁸Royalties are owed as soon as production in paying quantities begins. We therefore used the dates that royalties began as a proxy for when production began. In some cases, there may be a delay between when production began and royalties were paid, but we have no reason to believe that this is different for different categories of leases, so we think this assumption is reasonable.

²⁹We reviewed data from BLM's lease data system and ONRR's revenue data system. We also analyzed 209,989 leases that are largely older and were so ld through processes other than those established in the 1987 Reform Act, which, for the purposes of this report, we do not consider in our analysis of competitive and noncompetitive leases. These other leases accounted for about \$29.2 billion in revenues for fiscal years 2003 through 2019. This indicates that there are still many older leases, some that started as early as the 1920s, that continued to provide revenues in recent years. For more information on our methodology for matching lease and revenue data, please see app. I.

³⁰We estimated the \$16.1 billion in revenues from competitive and noncompetitive leases for fiscal years 2003 to 2019 based on leases that we matched between BLM's lease data and ONRR's revenue data.

³¹Competitive leases covered less acreage on average than noncompetitive leases, or about 756 acres versus about 1,238 acres per lease, respectively. Lease size limitations are set by the Mineral Leasing Act of 1920, as amended, and BLM regulations.

Table 1: Competitive and Noncompetitive Onshore Lease Revenues for Fiscal Years 2003 through 2019

Lease type	Total revenues in billions^a	Number of leases^b	Total acreage^b
Competitive	14.3	72,746	55,027,456
Noncompetitive	1.8	27,535	34,090,627
Total	16.1	100,281	89,118,084

Source: GAO analysis of Bureau of Land Management and Office of Natural Resources Revenue data. | GAO-21-138

Note: The revenue data we received from Interior's Office of Natural Resources Revenue (ONRR) reflect the amount operators reported to ONRR's Minerals Revenue Management Support System and not the amount collected by the federal government. Also, not listed in this table are 209,989 leases that are largely older and were sold through processes other than those established in the 1987 Reform Act which, for the purposes of this report, we do not consider in our analysis of competitive and noncompetitive leases. These other leases accounted for about \$29.2 billion in revenues for fiscal years 2003 through 2019.

^aTotal revenues reported for fiscal years 2003 to 2019 are rounded to the nearest hundred million.

^bThe figures identified in BLM's LR2000 data for the number of leases and total acreage are based on all competitive and noncompetitive leases, including those that produced revenues for fiscal years 2003 through 2019 and those that did not.

In addition, revenues from competitive leases averaged nearly 3 times the revenues from noncompetitive leases, or about \$196,000 and \$66,000 respectively.³² This is consistent with what three experts we interviewed told us; revenues from competitive leases are generally expected to be greater than revenues from noncompetitive leases because operators typically bid on lands with better prospects for oil and gas production (for additional information concerning oil and gas leases, see app. II).

Competitive Leases with High Bonus Bids Accounted for the Majority of Revenues During the Leases' 10-Year Primary Term and Were More Likely to Produce Oil and Gas Earlier

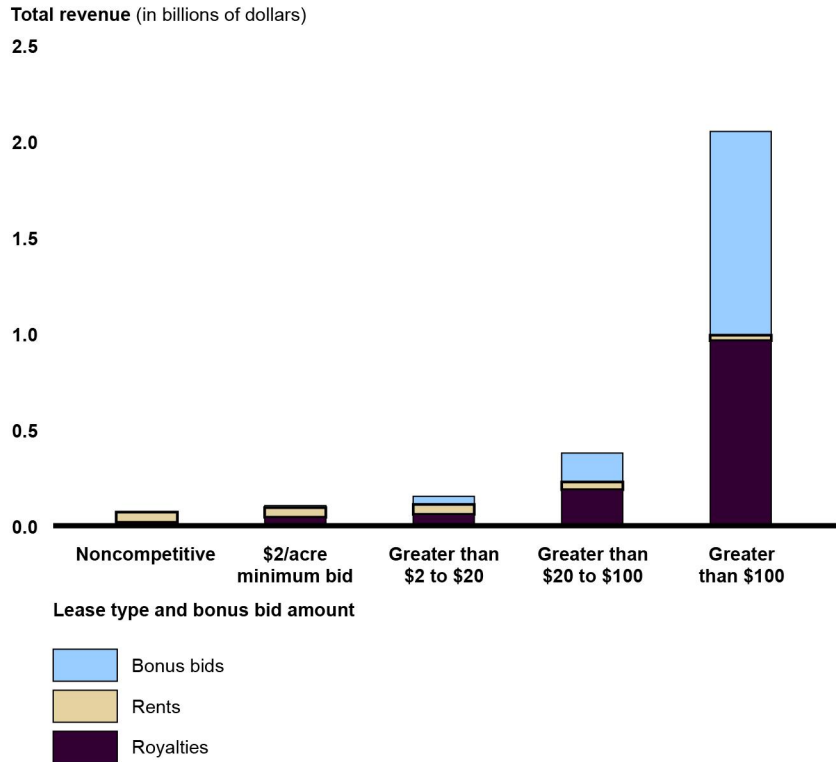
Competitive leases with high bonus bids (above \$100 per acre) comprised a small portion, or about 17 percent, of all competitive and noncompetitive leases but accounted for about three-quarters, or about 74 percent, of the revenues produced during the 10-year primary term for the selected leases we analyzed.³³ We also found that competitive leases with high bonus bids were more likely to produce oil and gas and begin production earlier in the 10-year primary term. Competitive leases with high bonus bids also accounted for about \$2.1 billion (about 74 percent) of the \$2.8 billion in total revenue.³⁴ In addition, our analysis of leases that started in fiscal years 2003 through 2009 showed that the level of bonus bids was positively associated with greater royalty revenue during leases' 10-year primary terms (see fig. 2).

³²For more information, see app. I.

³³We analyzed competitive leases with different bonus bids as well as noncompetitive leases that started in fiscal years 2003 through 2009. For these leases, we limited our analysis to revenues generated during the 10-year primary lease term. We also analyzed the types of revenues—specifically, rents, royalties, and bonus bid amounts. In addition to noncompetitive leases, our analysis considered four groups of competitive leases based on the bonus bid per acre that was equal to \$2; greater than \$2 to \$20; greater than \$20 to \$100; or greater than \$100. For more information, see app. I.

³⁴Our analysis of primary-term revenues from leases that started in fiscal years 2003 through 2009 captures about \$2.8 billion of the roughly \$16.1 billion reported for all competitive and noncompetitive leases during fiscal years 2003 through 2019.

Figure 2: Primary Term Revenues from Noncompetitive Leases and Competitive Leases by Bonus Bid That Started in Fiscal Years 2003 through 2009



Source: GAO analysis of Bureau of Land Management and Office of Natural Resources Revenue data. | GAO-21-138

Note: The revenue data we received from Interior’s Office of Natural Resources Revenue (ONRR) reflect the amount operators reported to ONRR’s Minerals Revenue Management Support System and not the amount collected by the federal government. We analyzed revenues for leases that started in fiscal years 2003 through 2009 to include leases that completed the 10-year primary lease term. These data reflect only revenues produced within the 10-year primary lease term for leases we analyzed. These data do not include about \$7 million in other revenues, including administrative fees that operators reported.

We also compared average revenues during the primary term from competitive leases sold at the minimum bonus bid of \$2 per acre with noncompetitive leases, which paid no bonus bids but paid an administrative fee.³⁵ These two types of leases might be expected to perform more similarly because the difference between the minimum bonus bid and the noncompetitive lease administrative fee is not

³⁵For fiscal year 2021, the administrative fee for competitive leases is \$170 and \$445 for noncompetitive leases. These administrative fees are adjusted annually. We limited our analysis to leases that started in fiscal years 2003 through 2009 in order to capture revenues during the primary lease term, which is 10 years.

significant.³⁶ Consistent with this expectation, we found that average revenues from competitive leases sold at the minimum bonus bid were about \$24,000 compared with about \$20,000 for noncompetitive leases.³⁷ We also found the amounts of revenues from these two types of leases differed in terms of the types of revenue—bonus bids, rents, royalties, and administrative fees (see fig. 3). Specifically,

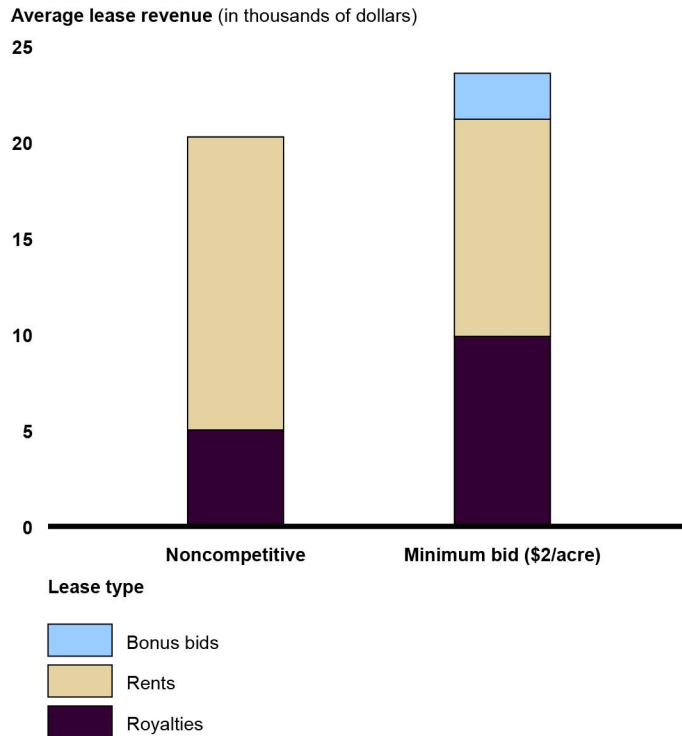
- most of the primary term revenue collected from noncompetitive leases came from rents. This is, in part, because noncompetitive leases were less likely to produce oil and gas than competitive leases, so a larger proportion of noncompetitive leases paid only rents during their primary terms compared with competitive leases. Further, when noncompetitive leases produced oil and gas, production started, on average, later in the lease's primary term compared with competitive leases sold at the minimum bid. In addition, annual rents from noncompetitive leases are generally greater than annual rents from competitive leases because noncompetitive leases typically have greater acreage.³⁸ Average rents from noncompetitive leases were about \$15,000 per lease, whereas rents from competitive leases sold at the minimum bonus bid were about \$11,000 per lease; and
- competitive leases sold at the minimum bonus bid of \$2 per acre paid more in royalties on average than did noncompetitive leases because they were more likely to produce, to produce sooner, and produce in greater amounts. Specifically, royalties from competitive leases sold at the minimum bid were about 2 times the amount of royalties from noncompetitive leases, about \$10,000 and \$5,000 per lease, respectively.

³⁶We also considered the number of bidders competing for a lease to be an indicator of bidder interest. We used bonus bids at the \$2 per acre minimum to indicate leases that had a single bidder and bids above \$2 per acre to indicate leases that had multiple bidders. In general, we assumed winning bonus bids provide a market signal that represents a lower bound for bidders' willingness to pay for a lease. We also used bonus bid amount as a proxy for a bidder's expectations about a lease's prospects for development at the time of sale. For more information, see app. I.

³⁷Since royalties account for the majority of revenues from leases beyond the primary lease term, restricting our analysis to primary term revenues underestimates lifetime royalty revenues from leases.

³⁸A comparison of revenues on a per-acre basis rather than a per-lease basis would increase the relative differences between noncompetitive and competitive lease revenues.

Figure 3: Average Primary Term Revenues from Noncompetitive Leases and Competitive Leases Sold at the Minimum Bonus Bid That Started in Fiscal Years 2003 through 2009



Source: GAO analysis of Bureau of Land Management and Office of Natural Resources Revenue data. | GAO-21-138

Note: The revenue data we received from Interior’s Office of Natural Resources Revenue (ONRR) reflect the amount operators reported to ONRR’s Minerals Revenue Management Support System and not the amount collected by the federal government. We analyzed revenues for leases that started in fiscal years 2003 through 2009 to include leases that completed the 10-year primary lease term. These data reflect only revenues produced within the 10-year primary lease term for leases we analyzed. In addition to the revenues we report here, there is a one-time administrative fee of \$445 for noncompetitive leases and \$170 for competitive leases for fiscal year 2021.

Overall, the vast majority of competitive and noncompetitive leases we reviewed did not produce oil and gas in their primary term. Specifically, we found that only about 7 percent of all leases we reviewed produced oil and gas in their primary terms. The likelihood of producing oil and gas in the primary term varied in terms of the size of the bonus bid, with leases with higher bonus bids being more likely to produce than leases with lower bonus bids, and all competitive leases being more likely to produce than noncompetitive leases. Similarly, competitive leases with high bonus bids (i.e., greater than \$100 per acre) produced more and therefore generated more royalties earlier in their primary term than did leases with lower bonus bids or noncompetitive leases. Competitive leases with

higher bonus bids also generated higher royalties during their primary terms. See table 2 for specific breakdowns of how the size of the bonus bid was associated with the timing and frequency of royalties generated from production.

Table 2: Primary Term Royalties from Noncompetitive and Competitive Leases by Bonus Bid That Started in Fiscal Years 2003 through 2009

Lease type	Number of leases that started in fiscal years 2003 through 2009	Percentage of leases that generated royalties during their 10-year primary terms	Average number of years before production and royalties began ^a	Total value of royalties generated during the primary term (in millions of dollars)	Percentage share of total value of royalties generated during the primary term
Competitive: Greater than \$100 bonus bid	3,369	25.9	3.7	963.0	75.7
Competitive: Greater than \$20 to \$100 bonus bid	3,843	7.2	5.0	188.0	14.8
Competitive: Greater than \$2 to \$20 bonus bid	4,306	3.7	5.4	59.1	4.6
Competitive: \$2 minimum bonus bid	4,422	1.9	4.7	43.7	3.4
Noncompetitive	3,493	1.2	5.8	17.5	1.4
All Competitive and Noncompetitive	19,433	7.4	4.3	1,271.3	100.0

Source: GAO analysis of Bureau of Land Management and Office of Natural Resources Revenue data. | GAO-21-138

Note: The revenue data we received from Interior's Office of Natural Resources Revenue (ONRR) reflect the amount operators reported to ONRR's Minerals Revenue Management Support System and not the amount collected by the federal government. We analyzed revenues for leases that started in fiscal years 2003 through 2009 to include leases that completed the 10-year primary lease term.

^aWe calculated the average number of years before royalties began based on the average number of months between the date a lease started and the first month that a lease generated royalties from the sale of oil or gas.

Agency Comments

We provided a draft of this report to Interior for review and comment. Interior provided technical comments, which we incorporated as appropriate.

As agreed with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies to appropriate congressional committees and the Secretary of the Interior, and other interested parties. In addition, the report will be available at no charge on the GAO website at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (202) 512-3841 or ruscof@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix III.

A handwritten signature in black ink that reads "Frank Rusco". The signature is written in a cursive style and extends across the width of the page with a long horizontal stroke at the end.

Frank Rusco
Director, Natural Resources and Environment

Appendix I: Objectives, Scope, and Methodology

This report describes revenues from competitive and noncompetitive leases for fiscal years 2003 through 2019. We obtained lease data from the Department of the Interior's (Interior) Bureau of Land Management's (BLM) database for mineral and land use—Legacy Rehost System 2000 (LR2000)—and revenue data from Interior's Office of Natural Resources Revenue's (ONRR) Minerals Revenue Management Support System (MRMSS). LR2000 contains information on lease characteristics, such as lease acreage, lease effective (or start) dates, and lease case types (i.e., lease types). To identify competitive and noncompetitive leases, we used LR2000 case types to classify groups of leases sold through the Federal Onshore Oil and Gas Leasing Reform Act of 1987 (1987 Reform Act) process.¹ MRMSS contains information on revenue amounts, revenue types (e.g., royalties, rents, and bonus bids), commodities produced (e.g., oil and gas), and the dates operators reported revenues and sold products that generated royalties.² To prepare MRMSS revenue data for analysis, we standardized information to combine revenues reported in two different data sets: the ONRR-2014 and ONRR Direct Billed data. We then aggregated the revenues to a unit of analysis defined by lease, month, revenue type, and commodity.

¹We used BLM's Oil and Gas LR2000 Desk Reference Guide to classify leases as competitive or noncompetitive based on post-1987 Reform Act case type codes. We classified the remaining leases in BLM's Desk Reference Guide as "other." While competitive and noncompetitive leases existed before 1987, the 1987 Reform Act changed how BLM offered those lease types for sale. For the purposes of this report, we limit our definition of competitive and noncompetitive leases to those that were sold through the 1987 Reform Act process.

²Where possible, we relied on ONRR's variable definitions that it uses for its publicly available data when using ONRR MRMSS revenue data. ONRR provided underlying tables for creating the variables presented in its publications. The revenue data we received from ONRR reflect the amount operators reported to ONRR MRMSS and not the amount collected by the federal government. The variable revenue type also includes a category for other revenues. The commodity category for gas includes natural gas and natural gas liquids.

To link information on lease characteristics to revenues, we developed a method to match leases in LR2000 and MRMSS data.³ Specifically, we used LR2000 data to construct a common lease number and matched about 98 percent of leases in ONRR's revenue data to leases in BLM's data.⁴ Once we combined LR2000 and MRMSS data, we used information on bonus bid revenues and lease acreage to identify competitive leases by bonus bid amounts, including leases that were sold at the minimum bonus bid of \$2 per acre.

For the purposes of this report, we limited our scope to federal onshore oil and gas leases and the revenues they produced from fiscal years 2003 through 2019.⁵ We further restricted our analysis to competitive and

³We developed our own method to match leases in LR2000 and MRMSS data because BLM and ONRR do not comprehensively link LR2000 and MRMSS data. Linking the data was possible because ONRR MRMSS contains a version of BLM's lease number entered with different formatting conventions than BLM's LR2000 lease number. To develop a common lease number, we identified five LR2000 variables—geographic state, BLM state office, numeric prefix, serial number, and an alphanumeric suffix—that represented the core elements of information contained in BLM's lease numbers. To ensure consistent formatting with MRMSS lease numbers, we deleted any blank spaces from all five LR2000 variables and removed leading zeros. Then, we combined the five adjusted LR2000 variables into a standardized lease number and merged leases in LR2000 and MRMSS using the BLM lease number from MRMSS.

⁴The matched leases accounted for over 99 percent of total revenues in MRMSS for federal onshore oil and gas leases. In addition, our definition of competitive and noncompetitive leases may not capture all lease types that went through the competitive leasing process. However, our matching was able to capture over 99 percent of revenues, and our conservative definition of competitive and noncompetitive leases captures most relevant leases for the purpose of our analysis.

⁵We limited our analysis to revenues reported for fiscal years 2003 through 2019 because we determined that ONRR MRMSS data were reliable for that time frame. We considered LR2000 leases with case type codes listed in BLM's Desk Reference Guide to be federal onshore oil and gas leases. We identified ONRR revenues for federal onshore oil and gas leases based on information in MRMSS about mineral type (oil and gas leases), land class (federal), and land category (onshore). In addition, we restricted revenues to oil, gas, and natural gas liquids. We also excluded leases in Alaska, since BLM does not record these leases in LR2000.

noncompetitive leases.⁶ With this scope, we reviewed leases that started in December 1986 through September 2019, and we reviewed revenues for fiscal years 2003 through 2019. As a result, we cannot report all revenue data for all leases.

To describe total revenues for competitive and noncompetitive leases, we added all revenues for fiscal years 2003 through 2019 from our matched data.⁷ To describe the total number of leases and total acreage, we included all competitive and noncompetitive oil and gas leases in LR2000 data. To adjust competitive and noncompetitive revenues based on the number of leases, we calculated the average revenue per lease by dividing total revenues for fiscal years 2003 through 2019 in ONRR MRMSS by the total number of leases in BLM's LR2000.⁸ Differences in the average revenue per lease among all competitive and noncompetitive leases do not suggest the difference in performance of leases, since we do not account for factors affecting the revenues from a lease, such as differences in geology or market conditions when leases started.

To compare how leases performed in terms of revenue, we further restricted our subsequent analyses to primary-term revenues for leases

⁶Our analysis included 72,746 competitive and 27,535 noncompetitive leases and excluded 209,989 leases we defined as "other." The majority (about 93 percent) of our other lease category included leases sold through processes that predate the 1987 Reform Act. Our other lease category also included renewal and exchange leases; private leases acquired with federal land acquisition; and leases sold through Special Acts, such as rights of way, units of the National Parks System, General Service Administration surplus lands, and Naval oil shale reserves. Since we focused on leases sold through the 1987 Reform Act process, our report defines competitive and noncompetitive leases more narrowly than BLM.

⁷We assigned revenues to fiscal years based on the date the revenues were posted in ONRR MRMSS data to be consistent with ONRR's public reporting of revenue data. Our analysis includes revenues from October 1, 2002, through September 30, 2019.

⁸ONRR MRMSS contained revenue data for fiscal years 2003 through 2019, so we were not able to report the full history of revenues for many older leases in BLM's LR2000 that may have produced revenues in earlier years. We use average revenues per lease to compare revenues. However, another reasonable metric is average revenues per acre. Since noncompetitive leases typically have greater acreage than noncompetitive leases, a comparison of revenues on a per-acre basis would increase the relative differences between noncompetitive and competitive lease revenues.

that started in fiscal years 2003 through 2009.⁹ By using only revenues that occurred within the first 10 years, we were able to consistently compare leases over their lifecycle and capture all types of lease revenue, including rents, bonus bids, and royalties.¹⁰ Also, limiting our analysis to the first 10 years of revenue allowed us to analyze production during the primary lease term, which is an indicator that a lease may generate revenues beyond its primary term.

To describe the relationship between bonus bids and primary-term revenues, we calculated bonus bid per acre by dividing each lease's bonus bid revenue by its acreage.¹¹ We then grouped competitive leases into four categories based on leases that had bonus bids per acre that were equal to \$2, greater than \$2 to \$20, greater than \$20 to \$100, and greater than \$100.¹² We compared total primary-term rents, royalties, and bonus bid amounts for each competitive lease bonus bid group and noncompetitive leases.

To address potential selection bias from lease sales, we compared the average revenue per lease for competitive leases sold at the \$2 per acre minimum bid with those of noncompetitive leases. Selection bias could arise if leases with higher expectations of generating revenues generally attract more bids than those with lower expectations of generating

⁹We defined the lease primary term as a 10-year period following a lease start date, calculated based on the lease effective (start) date from LR2000 and either the date products were sold (royalties) or the date revenues were recorded in MRMS (rents and bonus bids).

¹⁰Our data capture the first 10 years of revenue data posted after the lease started. Since ONRR allows operators to revise reported revenues for a 6-year period, it is possible that the revenue we report may be updated for some leases starting in later years. However, for leases starting in fiscal year 2003, we are confident that our data capture all royalties based on products sold between fiscal years 2003 through 2013, since our data include any updated royalties posted through fiscal year 2019, which captures the full 6-year revision period following the lease primary term.

¹¹We rounded up acreage to the next-highest integer to reflect BLM lease sale bidding rules for minimum bids, and bid increments.

¹²To create a bonus bid distribution, we rank-ordered competitive leases that started from fiscal years 2003 through 2009 by the bonus bid per acre amount and then broke them into four roughly even groups, or quartiles. Noncompetitive leases had a similar frequency as the categories of bonus bid amounts for competitive leases.

revenue.¹³ Competitive leases sold at the \$2 per acre minimum bid only received one bid, so we assumed their expectations of generating income were similar to noncompetitive leases that do not receive an adequate bid.¹⁴

Since royalties account for a majority of revenues from leases beyond the lease primary term, restricting our analysis to primary-term revenues underestimates the lifetime royalty revenue from leases. We therefore focused additional analysis on indicators of production.¹⁵ Specifically, we calculated metrics on the likelihood, timing, and amount of royalties during each lease's primary term. For each bonus bid per acre group, we calculated the percentage of leases that produced royalties, total royalty revenues, and each group's share of royalty revenues. Moreover, for leases that had royalties in the primary term, we calculated the average number of months until royalties began. To illustrate royalties generated over time, we graphed cumulative royalties for each bonus bid group by month from the start of the lease through the end of the primary term.

Our results should be interpreted in the context of some limitations. There are many factors that may influence bonus bids and royalties from leases, such as differences in geology, commodity prices, technological changes, and changes in other economic circumstances at the time of auction or during the lease term. We addressed some of these factors indirectly by

¹³For example, lands expected to have greater prospects for production may attract more bids and generate greater revenues from royalties. As we reported previously, the expected quality of the hydrocarbon resource—the likelihood of hydrocarbon presence, type, quantity, and amount recoverable—is a primary determinant in whether industry will consider pursuing a lease for a given tract. See GAO, *Offshore Oil and Gas: Opportunities Exist to Better Ensure a Fair Return on Federal Resources*, [GAO-19-531](#) (Washington, D.C.: Sept. 25, 2019).

¹⁴The defining distinction between competitive and noncompetitive leases is that competitive leases received at least one bid at a lease sale auction, while noncompetitive leases do not receive bids at or above the minimum bonus bid. Noncompetitive leases are only issued if no adequate bid is received at a competitive lease sale. Those competitive leases that received only one bid are at the minimum threshold of being considered competitive, so we considered them to be more comparable to noncompetitive leases than other competitive leases with more than one bidder. In addition, according to one expert, a \$2 per acre bonus bid is not a significant investment for operators. This is because other costs common to both competitive and noncompetitive leases, such as rents or development, represent significantly greater costs over the lifecycle of a lease. For example, both types of leases would accrue \$17.50 per acre in rental costs over 10 years, and a roughly \$10,000 fee is required to apply for a drilling permit.

¹⁵Royalties accounted for a majority of overall revenues from oil and gas leasing and provided an indicator of leases' revenues after the primary term.

using bonus bid amounts as a proxy for bidder interest and the leases' prospect for development.¹⁶ However, these measures are imperfect, and our results are descriptive statistics that cannot provide statistical associations about the relationship of bonus bids and revenues or comparisons of revenues between groups of leases.¹⁷ We present our results in the context of limitations.

In addition, leases that started in fiscal years 2003 through 2009 may not be representative of competitive and noncompetitive leases that started in other years.¹⁸ However, results from our analysis of these leases were consistent with auction theory and other empirical literature on oil and gas leasing.¹⁹ In general, we expect some findings may hold for leases that started in other years, since the federal leasing process has been largely the same since the 1987 Reform Act. By contrast, we expect our results may not be generalizable to revenues that occur after the primary term, particularly in cases where factors unknown at the time of auction, such as technological changes during the lease lifecycle, could affect royalties from production.

We assessed the reliability of BLM's LR2000 data and ONRR MRMSS data by (1) performing electronic testing, (2) reviewing existing

¹⁶We considered the number of bidders competing for a lease to be an indicator of bidder interest. We used bonus bids at the \$2 per acre minimum to indicate leases that had a single bidder and bids above \$2 per acre to indicate leases that had multiple bidders. In general, we assumed winning bonus bids provide a market signal that represents a lower bound for bidders' willingness to pay for a lease. We also used the bonus bid amount as a proxy for a bidder's expectations about a lease's prospects for development at the time of sale.

¹⁷Our analysis focuses on federal revenues produced by a lease and may not capture indirect benefits of oil and gas leases. For example, we do not assess the value of information generated from leases used for exploration purposes, such as to acquire geologic data or identify potentially viable fields. According to BLM, noncompetitive leases can be better suited for these purposes because they usually have more acreage.

¹⁸For example, leases may differ in terms of geology (e.g., hydrocarbon presence, type, quantity, amount recoverable) as well as drilling technology and market conditions at the time of the lease sale auction or during lease primary terms.

¹⁹Empirical economic literature suggests a correlation between the numbers of bidders on a lease during auction, bonus bid amounts, and the subsequent value of production from leases across various leasing contexts. For example, see W. Mead, "Toward an Optimal Oil and Gas Leasing System," *The Energy Journal*, 15:4 (1994): 1–18. For another example, see J.P. Brown et al., "Capturing rents from natural resource abundance: Private royalties from U.S. onshore oil & gas production," *Resource and Energy Economics* 46 (2016): 23–38. In addition, see T. Covert and R. Sweeney, "Relinquishing Riches: Auctions vs Informal Negotiations in Texas Oil and Gas Leasing," *NBER*, Working Paper 25712 (2019).

information about the data and the system that produced them, and (3) interviewing agency officials knowledgeable about the data. We determined that the data were sufficiently reliable for the purposes of this report.

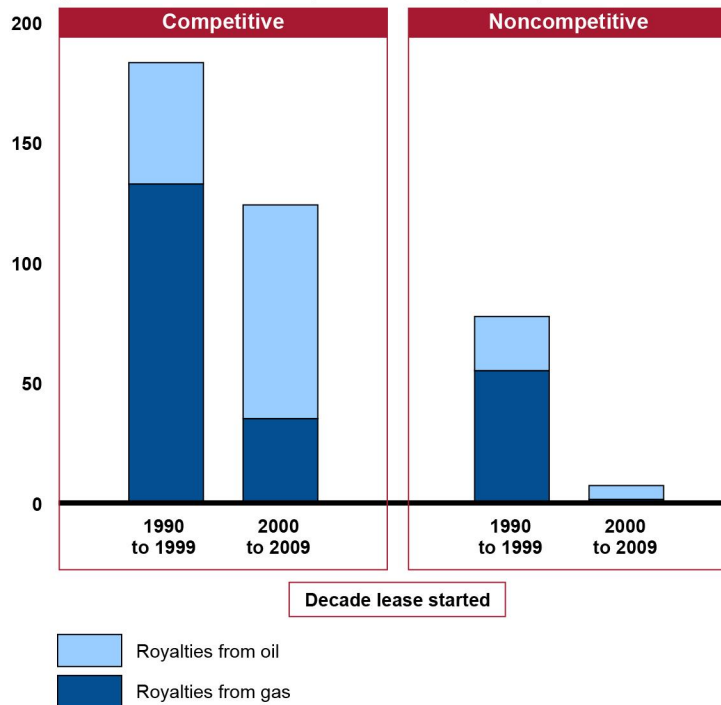
We also interviewed four experts who are academics and former government employees who are knowledgeable about federal oil and gas leasing. We interviewed these experts to obtain supplemental information on federal oil and gas leasing, specifically any differences between the competitive and noncompetitive leasing process and resulting revenues. We identified potential experts based on two literature searches and through recommendations from experts we initially contacted. We selected the experts based on their experience working with lease-level BLM and ONRR data, their published work that related to federal onshore oil and gas leasing, and time and resource considerations. We may not have identified all experts or researchers with a view on this topic or who have done work in this area, and the views of the experts we spoke with cannot be generalized to experts we did not interview.

Appendix II: Additional Information on Lease Revenues for Fiscal Years 2003 through 2019

Royalties from competitive and noncompetitive leases varied by commodity type over time. Specifically, the majority of royalties owed to the federal government for leases that started in the 1990s came from gas production, while the majority of royalties from leases that started in the 2000s came from oil production (see fig. 4).

Figure 4: Average Revenues from Competitive and Noncompetitive Leases for Fiscal Years 2003 through 2019, by Revenue Type and Decade in which the Lease Started

Average lease revenues for fiscal years 2003 through 2019 (in thousands of dollars)



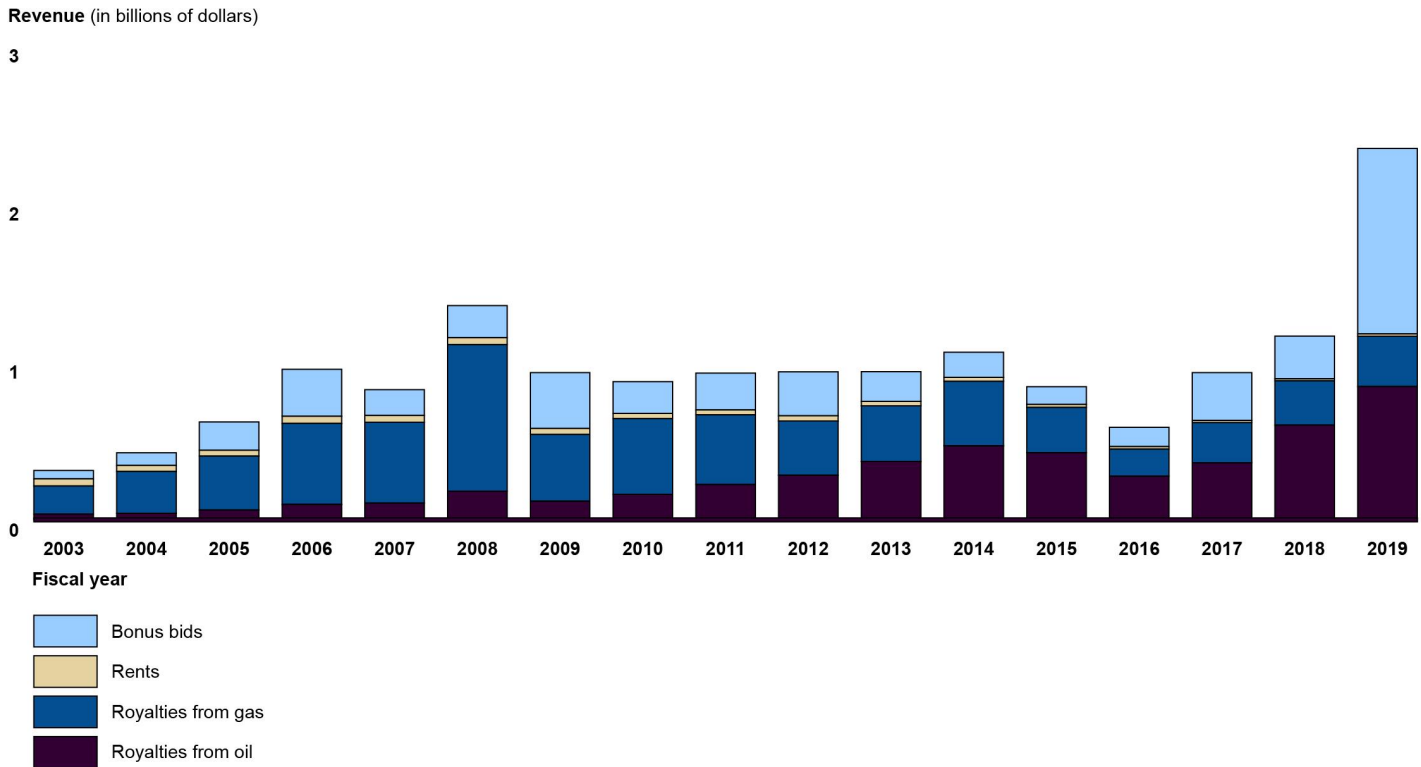
Source: GAO analysis of Bureau of Land Management and Office of Natural Resources Revenue data. | GAO-21-138

Appendix II: Additional Information on Lease Revenues for Fiscal Years 2003 through 2019

Note: The revenue data we received from the Department of the Interior's Office of Natural Resources Revenue (ONRR) reflect the amount operators reported to ONRR's Minerals Revenue Management Support System and not the amount collected by the federal government. In addition to the revenues we report here, ONRR also reported about \$57,000 in bonus bids per lease and \$2,300 per lease in other revenues, including administrative fees.

Figure 5 depicts revenues from competitive and noncompetitive leases for fiscal years 2003 through 2019, by types of revenues (e.g., bonus bids, rents). Revenues from royalties are broken out by oil and gas commodity.

Figure 5: Revenues from Competitive and Noncompetitive Leases for Fiscal Years 2003 through 2019, by Commodity and Revenue Type



Source: GAO analysis of Bureau of Land Management and Office of Natural Resources Revenue data. | GAO-21-138

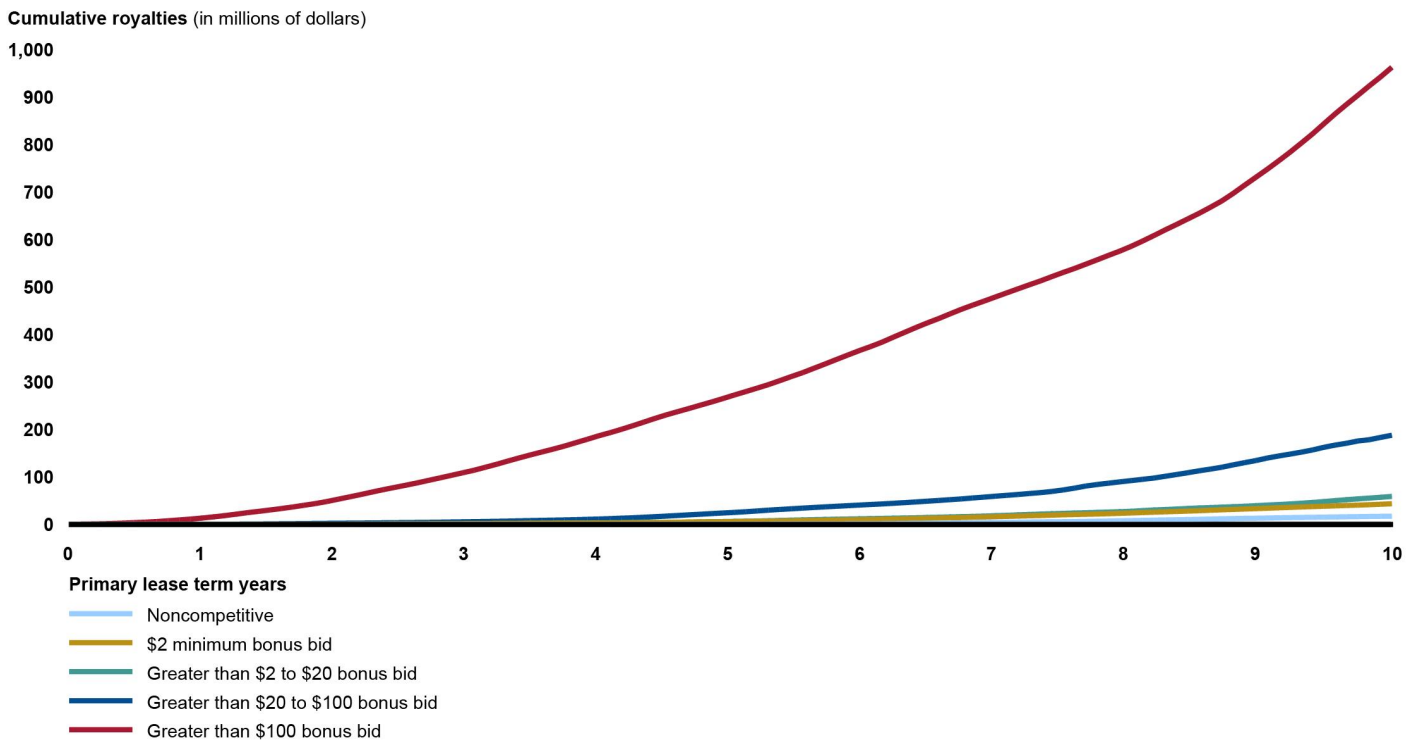
Note: The revenue data we received from the Department of the Interior's Office of Natural Resources Revenue (ONRR) reflect the amount operators reported to ONRR's Minerals Revenue Management Support System and not the amount collected by the federal government. Also, not listed in this table are 209,989 leases that were sold through processes other than those established in the Federal Onshore Oil and Gas Leasing Reform Act of 1987, which, for the purposes of this report, we do not consider in our analysis of competitive and noncompetitive leases. These other leases accounted for about \$29.2 billion in revenues for fiscal years 2003 through 2019.

Figure 6 depicts cumulative royalties from production (i.e., total royalties over time) that were generated during the primary term by leases that started in fiscal years 2003 through 2009, by bonus bid per acre group. Leases with high bonus bids (greater than \$100 per acre) made up the

Appendix II: Additional Information on Lease Revenues for Fiscal Years 2003 through 2019

majority of federal royalties from such leases (about 76 percent). In addition, competitive leases with high bonus bids generated over 3 times the amount of cumulative royalties by the end of their primary term than all other competitive and noncompetitive leases combined.

Figure 6: Cumulative Royalties from Competitive Leases, by Bonus Bid, and Noncompetitive Leases That Started in Fiscal Years 2003 through 2009



Source: GAO analysis of Bureau of Land Management and Office of Natural Resources Revenue data. | GAO-21-138

Note: The revenue data we received from the Department of the Interior's Office of Natural Resources Revenue (ONRR) reflect the amount operators reported to ONRR's Minerals Revenue Management Support System and not the amount collected by the federal government. We analyzed revenues for leases that started in fiscal years 2003 through 2009 to include leases that completed the 10-year primary lease term. Cumulative royalties refer to total royalties accumulated throughout the primary lease term.

Appendix III: GAO Contact and Staff Acknowledgments

GAO Contact

Frank Rusco, (202) 512-3841 or ruscof@gao.gov

Staff Acknowledgments

In addition to the contact named above, Christine Kehr (Assistant Director), Marie Bancroft (Analyst-in-Charge), Tara Congdon, John Delicath, Emily Gamelin, William Gerard, Cindy Gilbert, Joe Maher, Rebecca Mendelsohn, Dan Royer, and Jerry Sandau made key contributions to this report.

Appendix IV: Accessible Data

Data Tables

Accessible Data for Cumulative Royalties from Competitive Leases, by Bonus Bid, and Noncompetitive Leases That Started in Fiscal Years 2003 through 2009

na	Cumulative royalties (in millions of dollars)				
Years after lease started	Noncompetitive	\$2 minimum bid	\$2 to \$20	\$20 to \$100	Above \$100
0	0.00000000	0.00260317	0.01406589	0.00347423	0.19420439
0	0.00045473	0.00888567	0.01874820	0.00535648	0.36041325
0	0.00076838	0.01178206	0.02247934	0.00664046	0.46503481
0	0.00341543	0.01328994	0.02723214	0.00845120	0.56734133
0	0.01080432	0.01542793	0.03244380	0.01020573	0.80878520
0	0.01462721	0.01844777	0.04764680	0.04492874	1.15071094
0	0.02102846	0.02087238	0.05893976	0.07639072	1.59397221
0	0.02315353	0.02326746	0.07310215	0.12014925	2.16664243
0	0.02585612	0.02583666	0.08371239	0.15217915	2.91974068
0	0.03067186	0.02801586	0.09288622	0.19582553	3.92140412
0	0.03407641	0.03100411	0.10723388	0.24931268	4.91410637
0	0.03946768	0.03389015	0.13960052	0.30346957	6.22858858
1	0.04298432	0.03915475	0.18530190	0.35953301	7.85634994
1	0.04502067	0.04819718	0.22251953	0.42795333	9.61168957
1	0.04888119	0.06035161	0.25435501	0.48733318	11.48210144
1	0.05365266	0.07049430	0.31181803	0.55733764	13.57937336
1	0.06034324	0.09785548	0.34677857	0.62716377	16.01921654
1	0.07319178	0.12228113	0.37498951	0.70385903	18.68595505
1	0.08426396	0.14048015	0.39604807	0.85752714	21.72393036
1	0.10203419	0.18953845	0.41645917	1.00326467	24.91070557
1	0.11802463	0.23987594	0.43955782	1.13873780	27.68748856
1	0.13808052	0.28310037	0.46473765	1.39020741	30.55702209
1	0.14924727	0.34101197	0.48528713	1.62219489	33.63538742
1	0.16589262	0.41148633	0.51238310	1.84380257	36.87560654
2	0.17814794	0.51283681	0.55781514	2.07472730	40.48842621
2	0.19338141	0.61200738	0.61396021	2.31768322	44.04670715

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na	Cumulative royalties (in millions of dollars)				
	Years after lease started	Noncompetitive	\$2 minimum bid	\$2 to \$20	\$20 to \$100
2	0.20789683	0.68612891	0.65726203	2.55314112	48.30353546
2	0.22065923	0.79609209	0.70555180	2.77036238	53.20684433
2	0.23262215	0.93012524	0.75759214	2.96622109	58.09043121
2	0.24629450	1.02624631	0.82099354	3.16392493	63.06206131
2	0.26279604	1.13215971	0.86661124	3.37272716	68.33235931
2	0.28288719	1.20290268	0.92493945	3.60966659	73.40142822
2	0.30096683	1.28661859	0.99410826	3.82025528	78.13924408
2	0.31808910	1.35220492	1.07773554	4.04418898	82.82742310
2	0.33724982	1.44744051	1.15898454	4.29580307	87.70364380
2	0.35074925	1.57169664	1.23315906	4.53666067	92.98379517
3	0.36207092	1.67236555	1.30022526	4.86227989	98.18891144
3	0.37192002	1.78332007	1.42574620	5.26492834	103.52716830
3	0.38377795	1.89063609	1.53713119	5.61886358	108.88531490
3	0.39513835	2.02718902	1.64191353	6.01701737	114.23738860
3	0.40582114	2.16683412	1.76251459	6.41058922	120.54759220
3	0.41772345	2.27666426	1.93101883	6.80346966	126.88899990
3	0.42912075	2.40260029	2.09935045	7.22735691	133.71597290
3	0.43929899	2.51748633	2.25258327	7.74400377	140.33659360
3	0.45206803	2.64162278	2.39860272	8.25810146	146.72550960
3	0.46835419	2.78018284	2.57879281	8.71052074	152.78868100
3	0.48130003	2.89294791	2.76482868	9.14499950	158.88404850
3	0.49427104	3.00337911	2.91727376	9.61691093	165.30323790
4	0.51097453	3.10981250	3.03576899	10.17901516	172.44207760
4	0.52879214	3.21564293	3.20711970	10.86886120	179.47528080
4	0.55100876	3.30540013	3.40629864	11.54733086	186.81956480
4	0.57175124	3.42243385	3.58902478	12.35486317	193.32591250
4	0.58977974	3.56229949	3.77913094	13.32244778	200.40776060
4	0.60804516	3.72823334	3.98609495	14.15742970	207.95355220
4	0.62258291	3.88391805	4.17937183	15.26754665	215.75108340
4	0.64212894	4.07880735	4.36121702	16.51724052	223.67683410
4	0.66921115	4.39779568	4.54824209	17.74664116	231.10639950
4	0.69468915	4.76037598	4.70993376	18.99779892	237.86457820
4	0.72723472	5.12492085	5.00152111	20.35913277	244.55381770
4	0.73756272	5.41213989	5.39038467	21.64843369	251.50405880
5	0.76171058	5.65791368	5.78473616	23.02626228	258.27935790

Appendix IV: Accessible Data

na	Cumulative royalties (in millions of dollars)				
	Years after lease started	Noncompetitive	\$2 minimum bid	\$2 to \$20	\$20 to \$100
5	0.78239316	5.94102907	6.24594212	24.26966667	265.48583980
5	0.80456239	6.24677086	6.66591406	25.50231934	272.94531250
5	0.83600825	6.57722139	6.98582888	26.89403725	280.05212400
5	0.87342268	6.89232778	7.35469818	28.54963684	287.34259030
5	0.90169221	7.22046947	7.89933491	30.17318153	294.74487300
5	0.92712212	7.50834417	8.49859428	31.70551682	303.08050540
5	0.95116168	7.77544165	9.08096981	33.11007690	311.59582520
5	0.98340333	8.13582897	9.66187954	34.46195221	319.76699830
5	1.01421177	8.46258926	10.20039654	35.86067581	329.05426030
5	1.10426700	8.86530972	10.70939541	37.14890671	338.27188110
5	1.16853487	9.28778171	11.12866974	38.41745377	347.69570920
6	1.27230060	9.68650818	11.55165768	39.63362885	357.02838130
6	1.38931286	10.05378151	11.95205116	40.85556793	366.22039790
6	1.46876705	10.46862030	12.36980438	42.12882996	374.80389400
6	1.56821907	10.88840961	12.83463478	43.32837296	383.97665410
6	1.81666660	11.43786716	13.29896832	44.63643265	394.49285890
6	2.16445422	11.94096851	13.76420975	46.03771210	404.67285160
6	2.41834140	12.44217014	14.22429276	47.54935837	414.87756350
6	2.63898206	12.98733616	14.77777767	49.06143951	424.61590580
6	2.82512712	13.54052067	15.29056549	50.60798264	433.67480470
6	3.18571806	14.03931141	15.91796398	52.24988937	443.55114750
6	3.58301878	14.55548286	16.54442978	53.87760544	453.18023680
6	3.84019494	15.20531082	17.05626488	55.81107712	461.95599370
7	4.12557077	15.77728844	17.73999023	57.67225266	470.42959590
7	4.42341471	16.45246124	18.55055428	59.54997253	479.10128780
7	4.68190956	17.12791443	19.24008751	61.38973999	487.73556520
7	4.91264296	17.77404404	20.23294258	63.20119476	496.30697630
7	5.18614244	18.36022758	21.07972717	65.22823334	504.82064820
7	5.48186064	18.88493156	21.90294838	67.16904449	513.13085940
7	5.71756458	19.68684006	22.66553688	69.62300873	522.18444820
7	5.92100716	20.40936279	23.40304947	72.75142670	530.96521000
7	6.18669891	20.96454048	24.12246704	76.60293579	539.32153320
7	6.54183149	21.52364922	24.77843285	81.02291870	548.40588380
7	6.94052458	22.09070396	25.45990753	84.23619080	557.54547120
7	7.26871491	22.77029037	26.17225266	87.04920959	566.90826420

Appendix IV: Accessible Data

na	Cumulative royalties (in millions of dollars)				
	Years after lease started	Noncompetitive	\$2 minimum bid	\$2 to \$20	\$20 to \$100
8	7.78279209	23.53744507	26.99384880	89.80158234	575.93634030
8	8.13270664	24.25825691	27.89573860	92.47312927	585.94097900
8	8.61963654	25.11276436	29.19497871	95.12564087	596.97186280
8	9.06010532	25.91405678	30.54077148	97.82624817	608.56933590
8	9.54233074	26.69033432	31.57306099	101.56126400	620.55236820
8	9.90934277	27.46546745	32.58315659	105.24741360	631.95971680
8	10.33617687	28.27420616	33.73508453	109.06481930	643.74951170
8	10.87155628	29.03129196	34.80037308	113.09393310	655.51953130
8	11.48992634	30.01031113	35.64348221	116.72087100	668.28753660
8	12.05444717	30.90630531	36.53274155	120.65666200	681.58837890
8	12.48155594	31.72914696	37.46385193	125.62331390	697.37817380
8	12.91818714	32.63322830	38.39579391	130.22756960	714.54626460
9	13.21831894	33.45537567	39.63460159	134.67628480	731.32037350
9	13.64984989	34.25559616	40.86480331	139.90356450	748.14892580
9	14.11652279	35.19786835	41.95590210	144.25244140	765.75451660
9	14.52174854	36.01152039	43.29705811	148.20220950	783.89233400
9	14.80614662	36.89166260	44.72174835	152.32936100	803.14453130
9	15.11200333	37.67946625	46.38636398	156.97283940	822.68988040
9	15.48171043	38.44289780	48.26185989	162.56639100	843.97229000
9	15.76740742	39.23362732	50.26284409	167.26109310	864.97473140
9	16.19500351	40.07149124	52.22447586	171.08261110	884.79528810
9	16.54024506	40.77818298	53.95540619	175.90739440	904.01751710
9	16.91036797	41.62465668	55.55168533	178.51104740	923.72863770
9	17.25872993	42.64638901	57.33443069	183.39404300	942.65240480
10	17.52821350	43.72702789	59.11323929	187.95973210	962.99804690

Accessible Data for Figure 2: Primary Term Revenues from Noncompetitive Leases and Competitive Leases by Bonus Bid That Started in Fiscal Years 2003 through 2009

na	Total revenue (in billions of dollars)			
	Lease type and bonus bid amount	Royalties	Rents	Bonus bids
	Noncompetitive	0.018	0.053	0.000
	\$2/acre minimum bid	0.044	0.050	0.011
	Greater than \$2 to \$20	0.059	0.052	0.042
	Greater than \$20 to \$100	0.188	0.040	0.150
	Greater than \$100	0.963	0.028	1.060

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Accessible Data for Figure 3: Average Primary Term Revenues from Noncompetitive Leases and Competitive Leases Sold at the Minimum Bonus Bid That Started in Fiscal Years 2003 through 2009

na	Average lease revenue (in thousands of dollars)		
Lease type	Royalties	Rents	Bonus bids
Noncompetitive	5.016	15.251	0.000
Minimum bid (\$2/acre)	9.888	11.301	2.389

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Accessible Data for Figure 4: Average Revenues from Competitive and Noncompetitive Leases for Fiscal Years 2003 through 2019, by Revenue Type and Decade in which the Lease Started

na	Average lease revenue for fiscal years 2003 through 2019 (in thousands of dollars)	
Decade lease started	Gas Royalty	Oil royalty
Competitive: 1990 to 1999	132.65653992	50.55421448
Competitive: 2000 to 2009	35.01779938	88.99031830
Noncompetitive: 1990 to 1999	54.95274353	22.59890556
Noncompetitive: 2000 to 2009	1.47879148	5.79325104

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Accessible Data for Figure 5: Revenues from Competitive and Noncompetitive Leases for Fiscal Years 2003 through 2019, by Commodity and Revenue Type

na	Revenue (in billions of dollars)			
Fiscal year	Royalties from oil	Royalties from gas	Rents	Bonus Bids
2003	0.036	0.178	0.045	0.053
2004	0.041	0.265	0.038	0.080
2005	0.062	0.341	0.037	0.179
2006	0.098	0.512	0.045	0.297
2007	0.106	0.511	0.043	0.163
2008	0.181	0.927	0.044	0.203
2009	0.118	0.422	0.038	0.353
2010	0.161	0.479	0.033	0.201
2011	0.223	0.441	0.031	0.233
2012	0.282	0.343	0.033	0.278
2013	0.369	0.352	0.028	0.188
2014	0.468	0.408	0.025	0.159
2015	0.424	0.287	0.019	0.112
2016	0.276	0.171	0.016	0.122
2017	0.360	0.255	0.014	0.302
2018	0.599	0.280	0.013	0.270
2019	0.843	0.318	0.015	1.173

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Accessible Data for Figure 6: Cumulative Royalties from Competitive Leases, by Bonus Bid, and Noncompetitive Leases That Started in Fiscal Years 2003 through 2009

na					
Cumulative royalties (in millions of dollars)					
Years after lease started	Noncompetitive	\$2 minimum bid	\$2 to \$20	\$20 to \$100	Above \$100
0	0.00000000	0.00260317	0.01406589	0.00347423	0.19420439
0	0.00045473	0.00888567	0.01874820	0.00535648	0.36041325
0	0.00076838	0.01178206	0.02247934	0.00664046	0.46503481
0	0.00341543	0.01328994	0.02723214	0.00845120	0.56734133
0	0.01080432	0.01542793	0.03244380	0.01020573	0.80878520
0	0.01462721	0.01844777	0.04764680	0.04492874	1.15071094
0	0.02102846	0.02087238	0.05893976	0.07639072	1.59397221
0	0.02315353	0.02326746	0.07310215	0.12014925	2.16664243
0	0.02585612	0.02583666	0.08371239	0.15217915	2.91974068
0	0.03067186	0.02801586	0.09288622	0.19582553	3.92140412
0	0.03407641	0.03100411	0.10723388	0.24931268	4.91410637
0	0.03946768	0.03389015	0.13960052	0.30346957	6.22858858
1	0.04298432	0.03915475	0.18530190	0.35953301	7.85634994
1	0.04502067	0.04819718	0.22251953	0.42795333	9.61168957
1	0.04888119	0.06035161	0.25435501	0.48733318	11.48210144
1	0.05365266	0.07049430	0.31181803	0.55733764	13.57937336
1	0.06034324	0.09785548	0.34677857	0.62716377	16.01921654
1	0.07319178	0.12228113	0.37498951	0.70385903	18.68595505
1	0.08426396	0.14048015	0.39604807	0.85752714	21.72393036
1	0.10203419	0.18953845	0.41645917	1.00326467	24.91070557
1	0.11802463	0.23987594	0.43955782	1.13873780	27.68748856
1	0.13808052	0.28310037	0.46473765	1.39020741	30.55702209
1	0.14924727	0.34101197	0.48528713	1.62219489	33.63538742
1	0.16589262	0.41148633	0.51238310	1.84380257	36.87560654
2	0.17814794	0.51283681	0.55781514	2.07472730	40.48842621
2	0.19338141	0.61200738	0.61396021	2.31768322	44.04670715
2	0.20789683	0.68612891	0.65726203	2.55314112	48.30353546
2	0.22065923	0.79609209	0.70555180	2.77036238	53.20684433
2	0.23262215	0.93012524	0.75759214	2.96622109	58.09043121
2	0.24629450	1.02624631	0.82099354	3.16392493	63.06206131

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na	Cumulative royalties (in millions of dollars)				
	Years after lease started	Noncompetitive	\$2 minimum bid	\$2 to \$20	\$20 to \$100
2	0.26279604	1.13215971	0.86661124	3.37272716	68.33235931
2	0.28288719	1.20290268	0.92493945	3.60966659	73.40142822
2	0.30096683	1.28661859	0.99410826	3.82025528	78.13924408
2	0.31808910	1.35220492	1.07773554	4.04418898	82.82742310
2	0.33724982	1.44744051	1.15898454	4.29580307	87.70364380
2	0.35074925	1.57169664	1.23315906	4.53666067	92.98379517
3	0.36207092	1.67236555	1.30022526	4.86227989	98.18891144
3	0.37192002	1.78332007	1.42574620	5.26492834	103.52716830
3	0.38377795	1.89063609	1.53713119	5.61886358	108.88531490
3	0.39513835	2.02718902	1.64191353	6.01701737	114.23738860
3	0.40582114	2.16683412	1.76251459	6.41058922	120.54759220
3	0.41772345	2.27666426	1.93101883	6.80346966	126.88899990
3	0.42912075	2.40260029	2.09935045	7.22735691	133.71597290
3	0.43929899	2.51748633	2.25258327	7.74400377	140.33659360
3	0.45206803	2.64162278	2.39860272	8.25810146	146.72550960
3	0.46835419	2.78018284	2.57879281	8.71052074	152.78868100
3	0.48130003	2.89294791	2.76482868	9.14499950	158.88404850
3	0.49427104	3.00337911	2.91727376	9.61691093	165.30323790
4	0.51097453	3.10981250	3.03576899	10.17901516	172.44207760
4	0.52879214	3.21564293	3.20711970	10.86886120	179.47528080
4	0.55100876	3.30540013	3.40629864	11.54733086	186.81956480
4	0.57175124	3.42243385	3.58902478	12.35486317	193.32591250
4	0.58977974	3.56229949	3.77913094	13.32244778	200.40776060
4	0.60804516	3.72823334	3.98609495	14.15742970	207.95355220
4	0.62258291	3.88391805	4.17937183	15.26754665	215.75108340
4	0.64212894	4.07880735	4.36121702	16.51724052	223.67683410
4	0.66921115	4.39779568	4.54824209	17.74664116	231.10639950
4	0.69468915	4.76037598	4.70993376	18.99779892	237.86457820
4	0.72723472	5.12492085	5.00152111	20.35913277	244.55381770
4	0.73756272	5.41213989	5.39038467	21.64843369	251.50405880
5	0.76171058	5.65791368	5.78473616	23.02626228	258.27935790
5	0.78239316	5.94102907	6.24594212	24.26966667	265.48583980
5	0.80456239	6.24677086	6.66591406	25.50231934	272.94531250
5	0.83600825	6.57722139	6.98582888	26.89403725	280.05212400
5	0.87342268	6.89232778	7.35469818	28.54963684	287.34259030

Appendix IV: Accessible Data

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	Years after lease started	Noncompetitive	\$2 minimum bid	\$2 to \$20	\$20 to \$100
5	0.90169221	7.22046947	7.89933491	30.17318153	294.74487300
5	0.92712212	7.50834417	8.49859428	31.70551682	303.08050540
5	0.95116168	7.77544165	9.08096981	33.11007690	311.59582520
5	0.98340333	8.13582897	9.66187954	34.46195221	319.76699830
5	1.01421177	8.46258926	10.20039654	35.86067581	329.05426030
5	1.10426700	8.86530972	10.70939541	37.14890671	338.27188110
5	1.16853487	9.28778171	11.12866974	38.41745377	347.69570920
6	1.27230060	9.68650818	11.55165768	39.63362885	357.02838130
6	1.38931286	10.05378151	11.95205116	40.85556793	366.22039790
6	1.46876705	10.46862030	12.36980438	42.12882996	374.80389400
6	1.56821907	10.88840961	12.83463478	43.32837296	383.97665410
6	1.81666660	11.43786716	13.29896832	44.63643265	394.49285890
6	2.16445422	11.94096851	13.76420975	46.03771210	404.67285160
6	2.41834140	12.44217014	14.22429276	47.54935837	414.87756350
6	2.63898206	12.98733616	14.77777767	49.06143951	424.61590580
6	2.82512712	13.54052067	15.29056549	50.60798264	433.67480470
6	3.18571806	14.03931141	15.91796398	52.24988937	443.55114750
6	3.58301878	14.55548286	16.54442978	53.87760544	453.18023680
6	3.84019494	15.20531082	17.05626488	55.81107712	461.95599370
7	4.12557077	15.77728844	17.73999023	57.67225266	470.42959590
7	4.42341471	16.45246124	18.55055428	59.54997253	479.10128780
7	4.68190956	17.12791443	19.24008751	61.38973999	487.73556520
7	4.91264296	17.77404404	20.23294258	63.20119476	496.30697630
7	5.18614244	18.36022758	21.07972717	65.22823334	504.82064820
7	5.48186064	18.88493156	21.90294838	67.16904449	513.13085940
7	5.71756458	19.68684006	22.66553688	69.62300873	522.18444820
7	5.92100716	20.40936279	23.40304947	72.75142670	530.96521000
7	6.18669891	20.96454048	24.12246704	76.60293579	539.32153320
7	6.54183149	21.52364922	24.77843285	81.02291870	548.40588380
7	6.94052458	22.09070396	25.45990753	84.23619080	557.54547120
7	7.26871491	22.77029037	26.17225266	87.04920959	566.90826420
8	7.78279209	23.53744507	26.99384880	89.80158234	575.93634030
8	8.13270664	24.25825691	27.89573860	92.47312927	585.94097900
8	8.61963654	25.11276436	29.19497871	95.12564087	596.97186280
8	9.06010532	25.91405678	30.54077148	97.82624817	608.56933590

Appendix IV: Accessible Data

na	Cumulative royalties (in millions of dollars)				
	Years after lease started	Noncompetitive	\$2 minimum bid	\$2 to \$20	\$20 to \$100
8	9.54233074	26.69033432	31.57306099	101.56126400	620.55236820
8	9.90934277	27.46546745	32.58315659	105.24741360	631.95971680
8	10.33617687	28.27420616	33.73508453	109.06481930	643.74951170
8	10.87155628	29.03129196	34.80037308	113.09393310	655.51953130
8	11.48992634	30.01031113	35.64348221	116.72087100	668.28753660
8	12.05444717	30.90630531	36.53274155	120.65666200	681.58837890
8	12.48155594	31.72914696	37.46385193	125.62331390	697.37817380
8	12.91818714	32.63322830	38.39579391	130.22756960	714.54626460
9	13.21831894	33.45537567	39.63460159	134.67628480	731.32037350
9	13.64984989	34.25559616	40.86480331	139.90356450	748.14892580
9	14.11652279	35.19786835	41.95590210	144.25244140	765.75451660
9	14.52174854	36.01152039	43.29705811	148.20220950	783.89233400
9	14.80614662	36.89166260	44.72174835	152.32936100	803.14453130
9	15.11200333	37.67946625	46.38636398	156.97283940	822.68988040
9	15.48171043	38.44289780	48.26185989	162.56639100	843.97229000
9	15.76740742	39.23362732	50.26284409	167.26109310	864.97473140
9	16.19500351	40.07149124	52.22447586	171.08261110	884.79528810
9	16.54024506	40.77818298	53.95540619	175.90739440	904.01751710
9	16.91036797	41.62465668	55.55168533	178.51104740	923.72863770
9	17.25872993	42.64638901	57.33443069	183.39404300	942.65240480
10	17.52821350	43.72702789	59.11323929	187.95973210	962.99804690

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