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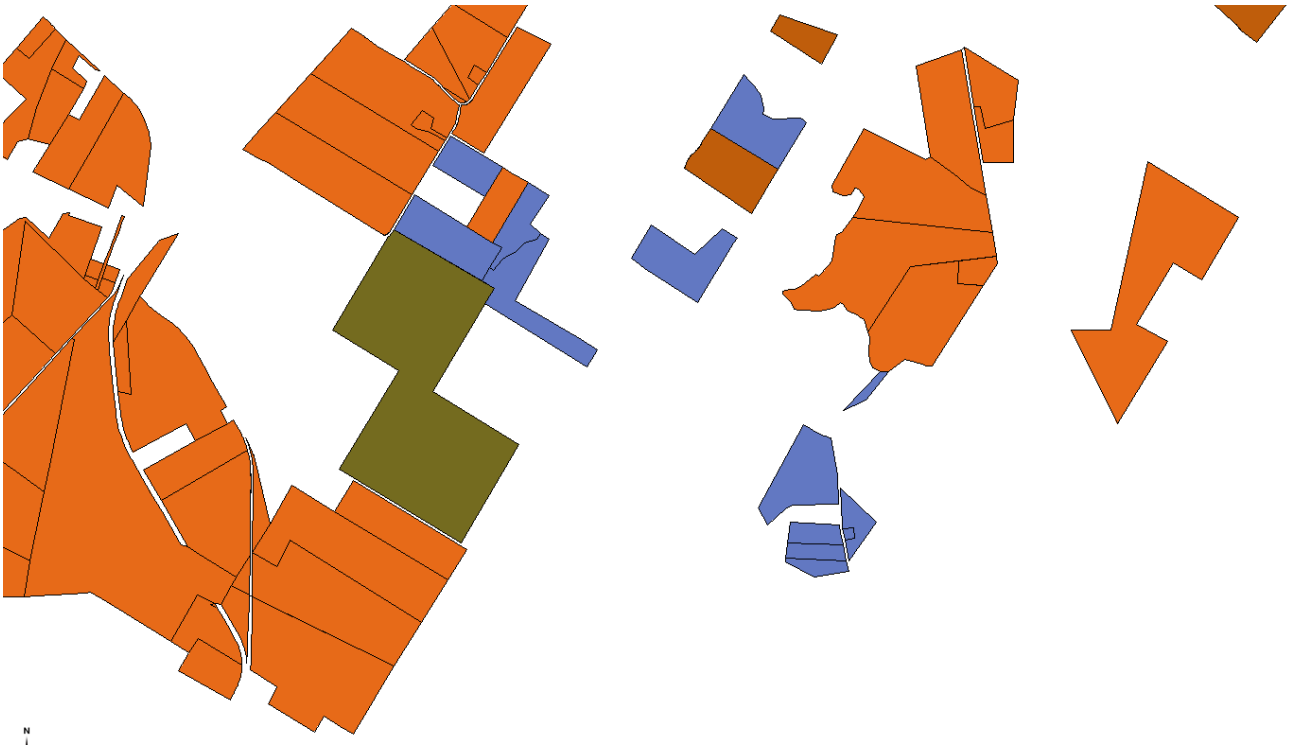
Understanding The Methodology Behind Blackbeard's Estimated Leasehold (HBP)

Summary

There is no easy way to discover which company holds what acreage under HBP (held-by-production). Using drilling units as proxy is sometimes done, with some sacrifice of accuracy. Better is the use of producing units as a proxy.

Blackbeard Data has developed an automated workflow of AI and humans to build a nationwide held-by-production data layer using 17 datasets, intelligent assumptions, and some plat validation.



Introduction

Oil companies need to know what areas are available to lease in order to effectively perform exploration and production. When active plays are running hot and fast, a great deal of time is invested

at the courthouse to determine who owns what minerals and where. In Texas and other states, such intense research can occur in the courthouse records room that it hits allowed capacity as set by the fire marshal. When that occurs the county clerk will ration time to each landman in order for all to have a fair shot to do research. The company with the most landmen at the courthouse has the advantage. If the landmen knew where existing leaseholds were, they would save valuable time by avoiding 'taken areas' which are composed of held-by-production leases and undrilled primary term leases.

The oil industry as a whole, is secretive. Leasing documents, farm outs, secretive memorandums and the like obscure the shape of oil and gas leases. True, the state does force the hand of operators to tell who operates what wells on which producing units, but it doesn't track the shape of the producing leasehold.

Oil and gas continues to shift to higher technologies for exploration. Along the way, better data is demanded. One dataset that is in dire need is leasehold polygons, both held-by-production and primary term leases.

Blackbeard's Geospatial team brings a solution to the problem by creating the eLH (Estimated LeaseHold) of the held-by-production polygons. They did this by creating software that applies a hybrid approach to polygon drawing, using AI and humans to create polygons. After 10 years of R&D on this problem, Blackbeard Data has developed a method for attaining both accuracy and speed.

Methodology

The traditional method of discovering HBP (held-by-production) acreage would be to have a landman research leases around known wells, find leasing documents. Next, compare the mineral leases with filed documents on wells drilled inside those leased minerals and hope to find plats that show the initial drilling unit boundaries to be used as a proxy for the HBP acreage.

Blackbeard's Geospatial team approached this differently. The cost to build a HBP dataset using the traditional method would be in tens of millions. Instead the Blackbeard team worked smart and combined AI and humans in the workflow to improve the efficiency and speed of finding the producing unit leasehold boundaries.

The word 'lease' in the oil industry is overused and can be highly confusing. Landmen will lease undrilled acreage with a 'mineral lease'. ie. Farmer John will lease 2000 acres to Exxon. Then Exxon might divide that into four different producing units often called 'production leases'. If all four of these produce oil, then the 'mineral lease' is held-by-production. Blackbeard's eLH dataset uses the production units as a proxy to determine the shape of the held-by-production area. Using drilling units or production units as proxy for HBP is a method common in the industry.

In order to find the boundaries of the production units, many supporting datasets are examined. Seventeen, in fact, are used. The data team at Blackbeard built AI to assist humans to determine the boundaries. The AI proposes multiple shapes based on the clues, and a human takes the next step to verify which is correct.

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AI proposes boundaries

All 17 of these datasets are run through Blackbeard Data's AI to predict boundaries. While the composition of the 17 specific datasets are kept a trade secret, it obviously includes wellspots, filings, cadastral and proprietary data.

Once these 17 datasets are ingested, the AI will find some clues in some of the data. Each dataset may or may not contain a clue to a boundary condition. But a few are likely to provide a clue on a boundary condition. For example, wellspots may show a south boundary, a filing may show a west boundary, cadastre hints at a east boundary and the remaining datasets show nothing. From these clues, the AI builds a polygon with a probability of accuracy, then it builds another polygon with a slightly different easterly boundary with a lower probability, and another with a different southerly boundary and another, etc. These are stored and put in the queue for a human to take it the rest of the way. In this case the human may look at 8 proposed polygons and the human quickly determines that one of them is correct.

In some cases, the boundary clues are so overwhelming that the AI approves the polygon without need of a human. Such as a 541.3 acre lease in Texas which matches the surface owners 541.3 acre farm that has 4 wells, one in each corner of the farm that are 467 feet from each edge of the farm and the lease name has the same name as the farm owner. Here there is overwhelming evidence the production lease is identical to the surface cadastre of the farm, so the QC software will auto approve this polygon without humans needing to confirm it.

Other cases where the AI auto approves a polygon is when the aliquots are available and the AI's Land Helper module draws the polygon from said aliquots.

Humans identify the correct polygon

On the business end of the AI sits a lease researcher who receives the proposed production unit polygons via custom software we call ROSE. Inside ROSE, the AI has proposed several polygons. The human will chose the lease polygon most likely to be correct using geospatial analysis tools, some of which often show plats. The choice is often simple for a human, but the AI at this time can not process the diverse forms of available information. Thus, a human closes the loop and picks the correct polygon.

Quality control

In some areas we have researched some production unit polygons from courthouse provided records with legal descriptions. The units are drawn and act as baseline controls. The AI is run for these counties that contain the control units. Upon completion, we compare the predicted polygons with the control polygons to determine accuracy.