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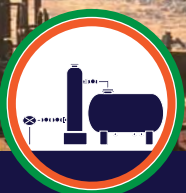
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Alaska exploration activity hard to gauge in 2018

Companies have shown an eagerness to return to the field but actual work is lagging behind those plans

By ERIC LIDJI
For Petroleum News

To accommodate our production calendar, The Explorers is written during the first few months of the year, which also happens to be the period of heaviest exploration activity in Alaska. This means that we are often summarizing activities as they are occurring.

Some revisions are always inevitable, but they seemed more voluminous this year.

The Explorers uses deceptively simple criteria to determine eligibility.

We try to include every operator that either drilled an exploration well during the two preceding years or has announced plans to drill an exploration well in the coming year.

It was easy to determine who had drilled in 2016 or 2017 but wasn't planning 2018 work.

ASRC Exploration Inc. drilled the Placer No. 3 well in early 2016 and later certified it as capable of producing in paying quantities. Accumulate Energy Alaska Inc. drilled the Icewine No. 2 well in early 2017 and commissioned a 3-D seismic program over its acreage this year in advance of more drilling in 2019. Ahtna Inc. subsidiary Tolsona Oil and Gas Exploration LLC drilled the Tolsona No. 1 well in mid-2016 and spent the following year embroiled in a regulatory debate over its suspension work. Caelus Energy Alaska LLC drilled the CT-1 and CT-2 wells in early 2016 and announced one of the largest oil discoveries in Alaska history. Hilcorp Alaska LLC expanded its focus on development activities by drilling 16 stratigraphic test wells on the Kenai Peninsula over the latter half of 2017.

But figuring out which companies were planning to explore this year proved to be a bit more difficult. Early on, we counted eight companies that had announced plans of some sort: Alliance, Armstrong, BlueCrest, ConocoPhillips, Doyon, Eni, Furie and Glacier.

We made a decision to cut Alliance from this issue when the company deferred its drilling plans at the Guitar unit to 2019. We look forward to including them next year.

Armstrong Energy LLC deferred a two-well program at the Pikka unit this winter but remained eligible for inclusion in The Explorers because of the Horseshoe No. 1 well it drilled from early 2017. In another twist, Oil Search Ltd. received approval to assume the operatorship of the Pikka program as we were putting the finishing touches on this issue.

BlueCrest Alaska Operating LLC last drilled an exploration well in 2013, with the Cosmopolitan No. 1 well led by Buccaneer. The company only made the cut this year because of its tentative plans to drill the H-16 Exploratory Lateral later in the year.

ConocoPhillips was a shoo-in for inclusion, both for its previ-

By the time the year comes to a close, as many as 15 exploration wells and sidetracks could have been drilled in 2018. But right now, we can only conclusively count one.

ous activities in the Greater Mooses Tooth unit and for its busy schedule for this year. The company announced plans to drill as many as eight penetrations at three prospects: Tinmiaq/Willow, Putu and Stony Hill. By the time The Explorers went to print, only one Tinmiaq well had been completed, according to the latest information available from public drilling databases.

Doyon drilled the Toghothle No. 1 well in the Nenana basin in 2016 and plans to return to the northern end of the basin this summer to drill the Totchaket No. 1 exploration well.

Eni returned to exploration activity in Alaska this winter after

continued on page 10

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Cover photo: BlueCrest #1 drilling rig located at the Cosmopolitan Unit in the Cook Inlet. Courtesy of BlueCrest Energy Inc.

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26



The Explorers

12 Accumulate

14 Ahtna

18 Armstrong/Oil Search

22 ASRC

26 BlueCrest

34 Caelus Energy

36 ConocoPhillips


42 Doyon

45 ENI

49 Furie






53 Glacier

55 Hilcorp



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Ad Index

58 Advertisers

Welcome

5 Alaska exploration activity
hard to gauge in 2018

Guest Editorial

8 The future starts today

Maps

30 North Slope & Beaufort Sea

32 Cook Inlet basin



14

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The future starts today

By **CHANTAL WALSH**

Alaska Division of Oil and Gas Director

Those of us who have traveled throughout Alaska are awed by its vast expanses of land that most people have never seen or know anything about. The same could be said of Alaska's oil and gas potential. After more than 60 years of oil and gas production in Alaska, we remain one of the most underexplored oil and gas regions in the world. However, recent discoveries of billion-plus barrel fields, the opening of more federal lands for leasing, and new technical resources provided by the state of Alaska are encouraging new exploration activity on our lands today and increased investment and production in the future.

World-class discoveries

Major new discoveries have been announced since 2016. Armstrong and Repsol characterized its Nanushuk discovery as a 40-mile-long, 3-mile-wide play, with the possibility of 3 billion barrels of oil extending from the Pikka Unit to the Horseshoe exploration well drilled 15 miles south.

ConocoPhillips Alaska Inc. has also been heralding success in the Nanushuk topset play. The Willow discovery in the Greater Mooses Tooth Unit of the National Petroleum Reserve-Alaska



CHANTAL WALSH

could produce as much as 100,000 barrels per day of oil, as early as 2023.

All of this comes on the heels of Caelus Energy's 2016 announcement that its Smith Bay lease holdings may contain as much as 6 billion barrels of light oil. In light of these announcements, the U.S. Geological Survey and the federal Bureau of Oceanic Energy Management are actively reassessing the Arctic Alaska region's mean undiscovered, technically recoverable conventional resources. As of December 2017, interim revisions raise the mean estimate for all Arctic Alaska by approximately 9 billion barrels to nearly 50 billion barrels of oil and natural gas liquids.

Leasing federal lands

The expansion of the federal government's leasing program in Alaska opens lands for exploration which have intrigued industry for decades. With the signing of Executive Order 3350, BOEM is developing a new five-year plan for oil and gas exploration in offshore waters, targeting the outer continental shelf of Alaska. The draft plan would open nearly all offshore areas of Alaska to leasing, though BOEM has reserved the right to remove certain areas before issuing a final Proposed Program. These offerings are in addition to the increased acreage made

continued on page 10



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WALSH continued from page 8

available within NPR-A during BLM's December 2017 lease sale, which encompassed 10.3 million acres. Finally, one of the most prospective areas in North America — the 1002 Area of the Arctic National Wildlife Refuge — was opened for future leasing and exploration. The Department of Interior has been directed to hold at least two lease sales in the next four years in the 1002 Area, a region estimated to contain as much as 10.4 billion barrels of oil.

North Slope exploration

The state of Alaska's North Slope lease sale in fall 2017 was the third largest sale in the last 20 years and the 2017-2018 exploration season has been one of the busiest in recent years. ConocoPhillips is actively drilling to appraise two different discoveries in the North Slope's hottest new play — stratigraphic traps in Brookian sequence Nanushuk topset reservoirs. Multiple exploration wells are in the works, including the Putu 2 and 2A and Stony Hill 1 and 1A in the central and southern parts of the 40-mile long Pikka-Horseshoe trend. The company's plans also call for drilling several more exploratory wells in the Willow-Tinmiaq trend some 30 miles farther west in the Greater Mooses Tooth Unit, Bear Tooth Unit and nearby non-unitized leases in NPR-A.

Eni and Shell are currently drilling a record-setting extended reach Nikaitchuq North exploratory well to test an undisclosed objective, drilling mostly horizontally from its Nikaitchuq Unit development on Spy Island to a bottom hole location outside the unit on federal OCS leases more than 34,000 feet to the north. Glacier Oil and Gas is drilling its Starfish 1 well at the Badami Unit, exploring to appraise undeveloped potential in the Killian interval, a turbidite sandstone reservoir slightly older than the Badami sands reservoir.

New North Slope 3-D seismic acquisition is underway, as industry capitalizes on recent exploration success and major inno-

continued on next page

WELCOME continued from page 5

a hiatus of more than a decade with the Nikaitchuq North ultra-extended reach well and sidetrack. But there had been no announcement about the status of either as The Explorers went to print.

Furie Operating Alaska LLC has proposed and deferred exploration plans for several years, focusing instead of immediate development needs. As we were putting this issue together, the company said it was evaluating the KLU No. 6 well for this summer.

Glacier Oil & Gas Corp. announced plans for two exploration ventures this year: the Starfish well at the Badami unit on the North Slope and a return to the Sabre well at the West McArthur River unit in Cook Inlet. The Sabre well was originally planned for earlier this year and now scheduled for summer. The Starfish well was planned for this winter, but the company had yet to receive final permits as The Explorers went to print.

What does all this mean?

By the time the year comes to a close, as many as 15 exploration wells and sidetracks could have been drilled in 2018. But right now, we can only conclusively count one. ●

Contact Eric Lidji at ericlidji@mac.com

WALSH continued from page 10

vations in seismic imaging. These new state-of-the-art surveys will translate into future drilling as explorers identify and rank prospects on state lands south of the Horseshoe discovery near the Colville River, state lands in the White Hills-Kuparuk uplands, as well as onshore and nearshore areas near the Point Thomson Unit and the ANWR coastal plain.

How the state helps

The Department of Natural Resources is now releasing seismic surveys and well data sets from exploration projects that earned tax credits under Department of Revenue statutes adopted since 2003. The data are made available through cooperation between the Division of Oil and Gas and the Division of Geological & Geophysical Surveys; locations and descriptions of wells and surveys are accessible via an interactive map on the Geologic Materials Center website. Industry and researchers are responding enthusiastically to these data releases, which have already begun to drive new exploration on leases encompassing tax credit datasets.

The GMC houses a collection of rock cores and cuttings that represent more than 16.7 million feet of unique energy exploration and production drilling samples and 76,000 linear feet of continuous core from more than 3,000 exploratory or production wells on federal, state and private lands in Alaska, including the Alaska outer continental shelf. The collection also holds a catalogue of palynology slides, geochemical results, geologic reports, geologic maps and USGS air photos, and much more.


As Alaska competes with oil provinces around the world to attract investment in exploration and development, recent activities and announcements have helped reestablish Alaska as a

place known for world-class resources. Industry is taking notice of new opportunities on state and federal lands where the next mega-discovery may be waiting. The state is making data available to assist companies during the exploration and development process. Viewing this as a whole, it is difficult to stay humble about Alaska's future. But, with what the state and industry are doing today, we expect we won't be waiting long to uncork our excitement. ●


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Accumulate shooting seismic in advance of drilling

88 Energy subsidiary commissioned the Icewine 3-D survey to provide information and induce partners for 2019 drilling program

By **ERIC LIDJI**
For Petroleum News

Accumulate Energy Alaska Inc. is stepping out at its Icewine project. The subsidiary of Australian independent 88 Energy Ltd. is following two seasons of drilling near the Dalton Highway with a series of permitting efforts this year designed to extend its exploration operations in the central North Slope a little farther to the west. Through a joint venture with Burgundy Xploration LLC, Accumulate began permitting two exploration wells and commissioned a 3-D seismic survey west of the haul road.

The joint venture began preliminary permitting on the Bravo No. 1 and Charlie No. 1 wells in mid-2017. The wells would be approximately 25 miles west of Franklin Bluffs. The company said it would drill the approximately 11,000-foot vertical wells “to test stacked conventional objectives” within the Seabee formation using the Arctic Fox 1 rig or a similar mobile land drilling rig. The target, according to the company, is the same target identified in surrounding exploration wells and pro-



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duced at the Meltwater satellite.

Bravo No. 1 was proposed for ADL 393048, ADL 393049, ADL 393058 and ADL 393059. Charlie No. 1 was proposed for ADL 393043, ADL 393044, ADL 393052 and ADL 393054. The nearest previous exploration wells are the Malguk No. 1 well that BP Exploration (Alaska) Inc. drilled in 1991 and the Smilodon 9-4-9 and Mastodon 6-3-9 wells that Chevron drilled as part of its White Hills exploration program in early 2008.

Chevron called its program “tight” at the time and declined to provide results, but the well files have since passed into the public record. The Smilodon 9-4-9 and Mastodon 6-3-9 wells were approximately 5,000 feet deep and both targeted Brookian natural gas.

Accumulate initially planned to drill Bravo and Charlie in early 2018 and began permitting ice roads in late 2017. But the company later postponed the wells until 2019 and has described Bravo and Charlie as part of a multiyear exploration campaign.

The current seismic program is the start of that campaign. Accumulate commissioned Geokinetics Inc. to conduct the Icewine 3-D survey covering some 200 square miles in an area of the central North Slope some 40 miles southwest of Deadhorse and 12 miles west of the haul road. According to permitting documents,

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Geokinetics would mobilize equipment from its Deadhorse facility and would mostly use existing roads and tundra travel, but might build a temporary ice pad and use the nearby Franklin Bluffs pad.

The goal of the seismic program, according to 88 Energy, is to determine drilling locations for the first half of 2019 and also to begin farming out acreage. The Icewine 3-D survey program began on Feb. 7 and was expected to last approximately 45 days.

Reducing risk

88 Energy and Burgundy Xploration formed their joint venture in November 2014.

Accumulate drilled the 11,600-foot Icewine No. 1 vertical well in the Franklin Bluffs region in late 2015 and acquired 2-D seismic information over its leasehold in early 2016.

Icewine No. 1 tested the potential of the HRZ shale and also conventional targets. The company initially planned to return to the well to drill a lateral with multistage fracturing but later abandoned that project in favor of drilling the 11,200-foot Icewine No. 2 well.

The vertical well would be cheaper and simpler than a lateral and would provide a wider array of rig options, saving some \$5 million in operating costs, according to the company.

Accumulate began drilling Icewine No. 2 in early 2017, reaching a target depth of 11,450 feet in mid-May. A completion program was designed to determine whether complex artificial fracture systems could be created within the HRZ. "These complex fracture systems are evident in the best performing shale plays as they result in maximized stimulation rock volume, which directly impacts potential flow rates," the company said.

A flow-test began in late August. By the time the company shut-in the well for winter in mid-September, Icewine No. 2 had produced an average of 1.85 thousand cubic feet per day of gas. The results were "not considered representative of potential flow rate or composition of hydrocarbon in the reservoir," according to 88 Energy. The company said it hoped to optimize and re-initiate flow testing sometime this spring using artificial lift.

After processing its 420-mile 2-D seismic acquisition over the Icewine area, 88 Energy identified some 20 conventional oil prospects in the Brookian sequence, according to 88 Energy. The company esti-

Following acquisitions in the latter half of 2017, the joint venture held approximately 460,000 acres in Alaska. In its annual report, 88 Energy praised the nature of these leases by writing, "Unlike the lower 48 States, these leases have an attractive 10-year term with no mandatory relinquishment and a low 16.5 percent base royalty."

mated that five of these prospects — Alpha, Bravo, Golf, India and Juliet — might hold a combined mean volume of 758 million barrels of oil.

The company narrowed its immediate focus at the time to Alpha and Bravo, although permitting applications from mid-2017 suggest that the company later swapped Charlie for the Alpha prospect. The Bravo prospect was the largest of initial five prospects, with a mean estimate of 273 million barrels of oil, according to internal company estimates.

The swap also suggested that the joint venture was localizing its efforts. 88 Energy has divided Icewine into three fairways: Eastern, Central and Western. The

Alpha prospect is in the Eastern region. The Bravo, Charlie West and Charlie 4 Way are in the Western.

According to 88 Energy estimates released in November 2017, after reprocessing the 2-D seismic information, Bravo could contain a gross mean of 232 million barrels, and the two Charlie prospects could contain a combined gross mean of 44 million barrels. The upcoming seismic program could potential provide the company with new priorities.

All told, the estimate counted gross mean resources of 1.891 billion barrels at Icewine.

Following acquisitions in the latter half of 2017, the joint venture held approximately 460,000 acres in Alaska. In its annual report, 88 Energy praised the nature of these leases by writing, "Unlike the lower 48 States, these leases have an attractive 10-year term with no mandatory relinquishment and a low 16.5 percent base royalty. Our prospective land holding is now of a size one would normally associate with the big end of town and provides scope to introduce drilling partners once prospects have been defined." ●

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Ahtna encounters familiar challenges with Tolsona

The Alaska Native corporation describes Glennallen-area well as 'disappointing,' spends year in regulatory tussle

By **ERIC LIDJI**
For Petroleum News

In the months before operations began on the Tolsona No. 1 well, and during the weeks operations were underway, Ahtna Inc. provided regular updates on its progress.

By comparison, the year that followed was somewhat quiet.

The biggest news was a regulatory dispute between the Alaska Native corporation and the Alaska Oil and Gas Conservation Commission over suspension activities at the well.

While that matter is largely resolved, the results of the well remain mostly unknown.

Through its wholly owned subsidiary Tolsona Oil and Gas Exploration LLC, Ahtna launched a natural gas exploration program in the Copper River region in recent years in the hopes of offsetting expensive energy sources with an affordable local supply.



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The program is the latest effort in decades of interest in the region around Glennallen, starting with the unsuccessful Eureka No. 1, drilled in 1953 with a cable tool rig. The subsequent exploration activity in the region yielded promising hydrocarbon shows but also identified significant geologic challenges that consistently thwarted development.

All 11 wells drilled in the Copper River region prior to the Tolsona program encountered gas. The most recent was the

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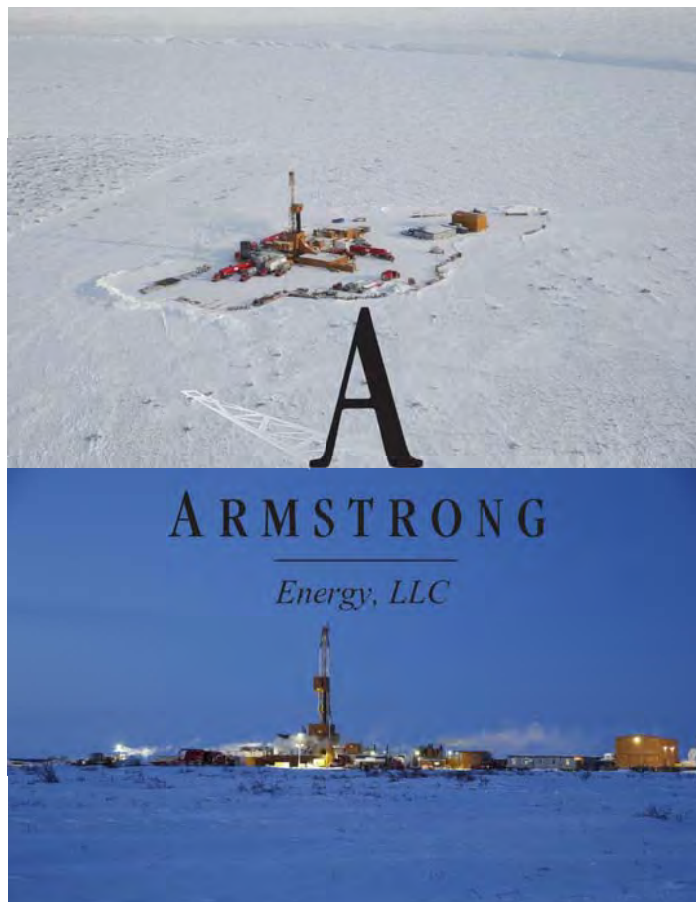
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Ahtna 1-19 well drilled by Texas-based independent Rutter & Wilbanks Corp. between 2005 and 2007, about two miles east of the current well.

But all 11 wells also encountered complex geology.

For example, Ahtna 1-19 found natural gas, but high subsurface pressures and water encroachment ultimately forced Rutter & Wilbanks to plug and abandon the well.

Armed with this knowledge, Ahtna used especially large diameter casing strings to accommodate additional casing when the well encountered water. The company also used "managed pressure drilling" to respond to high pressures encountered in the well. And the drillers started with a small 1,100-foot pilot hole before setting the first casings.

Even with these precautions, and with the knowledge gleaned from seismic and well data, Ahtna was forced to improvise in response to unexpected geology. "We had to drill the well deeper than we had proposed because the formations were coming in deeper in the fault block that we were in," drilling manager Marty Lemon said in December 2016.

Ahtna drilled the 5,500-foot Tolsona No. 1 well — some 700 feet deeper than it had originally intended — into the thick Nelchina sandstone intervals of the basin in late 2016.

Log data obtained from the well indicated the possibility of a natural gas resource, but Ahtna was unable to say at the time whether it had discovered commercial volumes. The company referenced five distinct intervals of interest to consider during flow testing and said testing would involve perforating well casing between 5,000 and 5,220 feet.

In early January 2017, Ahtna said that it expected data evaluation on the well to last for several months. The company provided no additional results about the drilling or testing throughout 2017. But in an annual message in January 2017 where he formally announced the decision to suspend operations, Ahtna CEO Tom Maloney wrote, "These results are very disappointing, as we have all hoped and prayed for commercial success."

AOGCC fine

Instead, the biggest news out of the project came in late May 2017, when the AOGCC proposed a \$380,000 fine against Tolsona Oil and Gas for regulatory shortcomings.

The agency had issued a notice of pro-

Ahtna conducted the Tolsona No. 1 program through an exploration license.

posed enforcement action against the company in April 2017 for failing to provide pressure reports, to give inspectors from the commission a chance to witness pressure tests and to install a required pressure gauge on the well.

The action emerged from suspension activities at the well in December 2016.

Early in the suspension operations, increased pressure in the casing annulus of

the well triggered various pressure monitoring and reporting requirements by the AOGCC. The company was slow to respond or entirely non-responsive to these requirements throughout February and March 2017, leading to the fine, according to the AOGCC.

Through its subsidiary, Ahtna formally responded to the charges in late June 2017.

"Immediately upon receipt of the Order, Tolsona performed a comprehensive internal investigation, which revealed numerous deficiencies in Tolsona's com-

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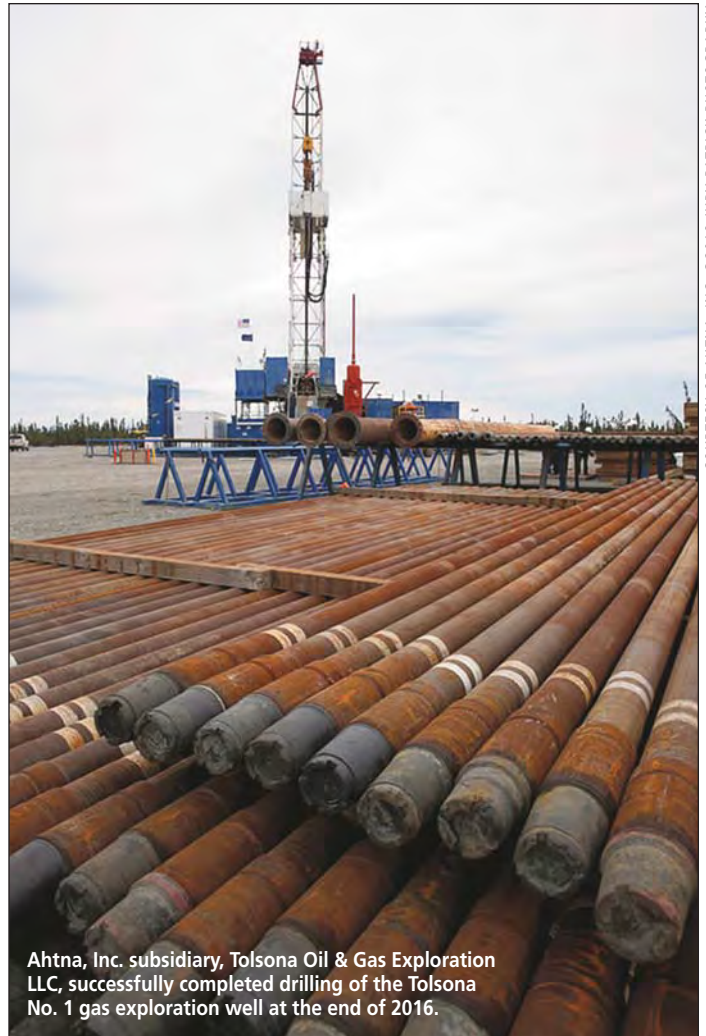
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Ahtna, Inc. subsidiary, Tolsona Oil & Gas Exploration LLC, successfully completed drilling of the Tolsona No. 1 gas exploration well at the end of 2016.

COURTESY OF AHTNA, INC. ©2018 JUDY PATRICK PHOTOGRAPHY

AHTNA continued from page 15

munication, both internally and with the AOGCC,” the company wrote in its June 23 response. “These were caused by changes in personnel, the loss of experienced technical capacity, a failure to create internal redundancy, and lack of oversight in the communication channel.”

The company described an ongoing situation where readings were taken but never delivered to the AOGCC as required, and where information was received from the AOGCC but never delivered to the appropriate senior management of the company.

As a response to the shortcomings, Ahtna instituted new internal communication policies and hired Petrotechnical Services of Alaska to assist with communication to the AOGCC.

But the company also lobbied for a lesser penalty, saying that \$380,000 was disproportionately high by the standards of other fines issued to other operators.

At a mid-September 2017 hearing, Tolsona officials described the circumstances surrounding their violation and detailed their efforts to correct those problems going forward. The AOGCC reduced the fine to \$92,000 in a late November 2017 ruling.

All told, the AOGCC imposed a \$60,000 penalty against the company for failing to install appropriate gauges at the well and a \$32,000 penalty for failing to provide monthly pressure reports. The commission also ordered to company to begin the application process for plugging and abandoning the exploration well



Tolsona No. 1 drill rig

before Dec. 14, 2017.

Exploration licensing

Ahtna conducted the Tolsona No. 1 program through an exploration license.

The state issued a five-year license for the Tolsona basin in December 2013. The license covered 43,492 acres and required Ahtna to spend at least \$415,000 on exploration.

The company had already spent \$3 million on the program by February 2015 and estimate a total cost between \$10 million and \$15 million by the end of operations.

The program began with considerable seismic acquisition.

Ahtna commissioned Global Geophysical Services in late 2014 to conduct a 2-D survey covering some 40 miles. Ahtna also reprocessed some 80 miles of existing 2-D data.

Based on these efforts, Ahtna Vice President of Land and Resources Joe Bovee told the House Energy Committee in February 2015 that the company had a 60-to-70 percent chance in finding natural gas with a new well in a geologic structure west of Glenallen. ●

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Oil Search takes over at the Nanushuk development

The ASX-listed independent partners with Armstrong to tackle one of the biggest Alaska discoveries in decades

By **ERIC LIDJI**
For Petroleum News

Oil Search Ltd. became the newest operator in Alaska in mid-March 2018, when the Division of Oil and Gas and Arctic Slope Regional Corp. approved the transfer of working interest at the Pikka and Horseshoe prospects from Armstrong Energy LLC.

The independent with offices in Australia and Papua New Guinea acquired a 25.5 percent interest in the Pikka unit and adjacent exploration acreage and a 37.5 percent interest in the Horseshoe block and the Hue shale for \$400 million, according to information that the company provided to analysts in November 2017, when it announced the acquisition.

Oil Search described the \$400 million price as a low-cost entry into Alaska “made at an attractive time in the commodity cycle.” According to the company, the price equates to \$3.10 per barrel, with potential resource upside reducing the cost to \$1.30 per barrel.



KEIRAN WULFF

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TOP ALASKA EXECUTIVE: Keiran Wulff, president, Oil Search Alaska
TELEPHONE: 907 375-6900
WEBSITE: www.oilsearch.com



At the time, Oil Search also announced an option, through June 30, 2019, to acquire an even larger interest in the project. For an additional \$450 million, the company could acquire Armstrong’s remaining 25.5 percent and partner GMT Exploration’s remaining 37.5 percent interest in the Pikka unit and the Horseshoe block, as well as an additional 25.5 percent interest in adjacent exploration acreage and 37.5 percent in the Hue shale.

Oil Search has taken over the Armstrong offices in downtown Anchorage, expanding them to accommodate a staff of 110 people, and said it “will form a long-term partnership with Armstrong, leveraging its technical capabilities and experience in the identification of additional potential growth opportunities in Alaska.”

Upcoming plans

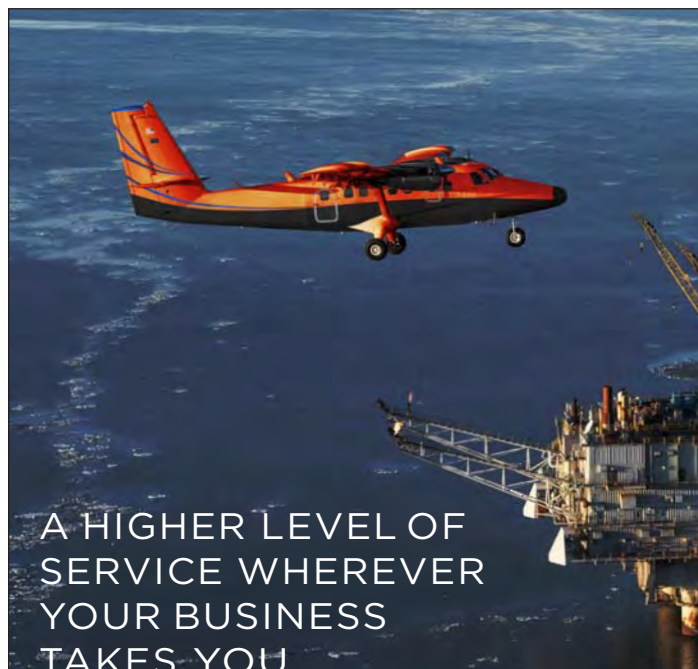
At the time of the announcement, Armstrong was planning to drill the Pikka No. 2 well and Pikka No. 2A sidetrack in the southern portion of the Pikka unit this winter, although it is not yet clear where Oil Search will drill next winter.

The company described the program as a delineation campaign with the potential to prompt revisions to early engineering and design work and reservoir modeling that was already underway at the Nanushuk development project planned for the Pikka unit. The company proceeded with early facility design before finalizing subsurface design “in an effort to progress the Nanushuk project as expeditiously and efficiently as possible.”

The Alaska Oil and Gas Conservation Commission issued permits for Pikka No. 2 and Pikka No. 2A in late December, after Armstrong and partner GMT Exploration Co. LLC announced a pending sale of a portion of their interest in the project to Oil Search Ltd.

Armstrong decided in mid-January 2018 to defer the delineation program for a year. The company had made a similar decision the year before, cancelling its Pikka No. 1 well at the request of local community groups. In both cases, the decision to defer work plans was tempered by an information sharing agreement with ConocoPhillips Alaska Inc.

The agreement proved to be moot last year because ConocoPhillips also deferred drilling plans in the region, pushing off its



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proposed Putu well. The agreement is more likely to be useful this year, given that ConocoPhillips could risk losing acreage if it fails to drill and, at this writing in early April, was reportedly finished drilling Putu No. 2 and 2A wells (not confirmed by ConocoPhillips).

Partners

Armstrong is known in Alaska for bringing on interesting partners. Historically the Denver-based company has preferred to operate on equity rather than on debt and has preferred to discover and prove up resources rather than operating development programs, which explains why the company has been interested in teeing up projects for other players.

To date, four companies have been involved in the Pikka project.

Working with Denver-based independent GMT Exploration Co. LLC, Armstrong acquired a swath of mostly onshore acreage across the central North Slope in 2008 and 2009. They persuaded the Spanish major Repsol YFP to join the project in 2011.

Under the deal, Repsol acquired a 70 percent interest in 494,211 acres across the North Slope and announced plans to spend around \$768 million, mostly on exploration. The joint venture eventually increased both its land position and its budget, leasing some 750,000 acres across the North Slope and spending about \$1 billion on activity. As operator of the joint venture, Repsol drilled 16 wells and sidetracks, commissioned two 3-D seismic surveys and formed the Qugruk and Pikka units in the Colville River Delta.

After announcing a major discovery in the Alpine and Nanushuk formations over the latter half of 2015, the joint venture began permitting a development at Pikka by launching an environmental impact statement with the U.S. Army Corps of Engineers.

All signs pointed toward a quick development decision. But somewhat unexpectedly, the joint venture reorganized. The shuffle essentially flipped the arrangement, turning Armstrong into the operator and majority owner and giving Repsol a minority stake.

In early 2017, as the new operator, Armstrong drilled the Horseshoe No. 1 well and No. 1A sidetrack some 20 miles south of the Pikka unit, near a horseshoe bend in the Colville River. After completing the wells, Armstrong increased its previous discovery estimates.

With regulatory approval in late March 2018, Oil Search became the operator of the Pikka unit, while Repsol retained its 49 percent minority interest.

Oil Search

Although unknown in Alaska, and not particularly well known on the international stage, Oil Search is an old hand by industry standards. The company was founded in 1929 and has partnered with ExxonMobil and Total in two major liquefied natural gas operations in Papua New Guinea, as well as being operator of all producing oil wells in the country.

Oil Search estimated it would cost some \$4 billion to develop an oil resource of some 500 million barrels. The figures describe the first phase of a larger development, according to the company, with initial activities yielding first oil from the Nanushuk as early as 2022.

As described by Armstrong Energy geologist Colby VanDenburg at the Resource Development Council conference on Nov. 15, 2017, the joint venture is envisioning a development with some 146 wells from three drilling pads east of the Colville River. The project would require some 35 miles of pipeline, 25 miles of road and a central processing facility with the capacity to handle some 120,000 barrels of oil per day. The program would target the Nanushuk with a second-

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ary target in the Alpine C sands.

Oil Search said it would fund much of its new Alaska venture through surplus cash. The company is reporting liquidity of \$2 billion — \$1.2 billion in cash and \$850 million in undrawn corporate facilities. The company estimated that its equity funding requirement for the proposed \$4 billion development project would be around \$300 million to \$400 million, payable over a three-year construction period. The company expected project financings to be readily available, given the stability and maturity of the Alaska industry.

A major find

Oil Search told analysts it had made its deal on the basis of some 500 million barrels of recoverable oil but noted that Armstrong offered estimates surpassing 1 billion barrels.

Either way, the figures acknowledge the magnitude of the discovery.

With the exception of a few vague comments made at earnings calls and industry conferences, the Repsol-led joint venture remained tight-lipped about its progress until mid-2015, when it announced discoveries in the East Alpine and Nanushuk formations.

It soon became clear that the joint venture had made a potentially historic discovery. The companies reported proven contingent oil reserves of 497 million barrels, probable contingent reserves of 1.4 billion barrels and possible contingent reserves of 3.7 billion barrels. They estimated that the field could produce 120,000 barrels per day, which would singlehandedly increase throughput on the trans-Alaska oil pipeline by nearly 25 percent.

And the nature of the play offered the potential for those numbers to grow. The Nanushuk and Alpine formations represented just two of the six notable horizons present in the region. And the com-

panies had only explored about 10 percent of their total leasehold.

Armstrong founder and top executive Bill Armstrong described the Nanushuk discovery as “a new and different play for the North Slope,” with thicker pay found at shallower depths. “That’s what makes it so exciting. Nobody has seen this formation productive in this depositional environment before. You look at how thick it is, how good the oil is, how good the reservoir is — it all bodes really well for the play,” he said in early 2016.

Enthusiasm quickly spread. Responding to the company-provided estimates, then-Alaska Department of Natural Resources Commissioner Mark Myers noted in February 2016 that “the proven contingent oil reserve number makes the discovery the largest since the Alpine field, the probable contingent reserve number the largest since the Kuparuk field, and the possible contingent number makes the discovery the largest since Prudhoe.”

At an Alaska Geological Society meeting in mid-April 2016, U.S. Geological Survey geologist Dave Houseknecht said that the Nanushuk discovery revealed the possibility of undiscovered oil resources along a fairway extending perhaps 100 miles to the west, referring to the find as “pretty astounding.”

According to VanDenburg, the thick sands that form the Pikka reservoir can be traced along a zone more than 40 miles wide, which explains why Armstrong drilled its Horseshoe exploration well some 21 miles to the south. By comparing the Horseshoe well to previous wells drilled to the north, the company was able to confirm the existence of a single large oil field with the potential for more than 10 billion barrels of oil in place.

“When you’re chasing fields of that size, it changes everything,” VanDenburg said. ●

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ASRC certifies Placer well but stays mum on results

The state and the Arctic Slope Regional Corp. subsidiary have been disputing the next steps for the soon-to-expire Placer unit

By **ERIC LIDJI**
For Petroleum News

ASRC Exploration LLC completed its first operated exploration well in Alaska in early 2016, when it drilled Placer No. 3 at the Placer unit, west of the Kuparuk River unit.

And although the exploration arm of Arctic Slope Regional Corp. has hinted that the prospect is economically viable, the project is burdened by a dispute with the state. In July 2017, Division of Oil and Gas Director Chantal Walsh approved a new plan of development for the unit running through Sept. 8, 2018, but called unitized development “highly unlikely” given the lack of

production or operations detailed in the new plan.

(A unit is not a prerequisite for oil and gas development in Alaska. AIX Energy LLC, for example, has been developing the Kenai Loop gas field for years on a lease basis.)

The current plan of development running through September 2018 calls for com-

pleting a reservoir map using new and existing seismic data; negotiating for access to regional infrastructure; and continuing engineering work for drilling pads, roads and pipelines.

Certification

ASRC Exploration did not announce any detailed results after completing the Placer No. 3 well in early 2016, but the company has provided interesting clues about its efforts.

In state filings after completing drilling operations, the company said that Placer No. 3 had “confirmed extension of the Placer reservoir beyond the central Placer No. 1 location.” The well had identified one productive interval, and the company suggested that there was the potential for identifying additional intervals with more drilling.

The state certified the Placer No. 3 well as being capable of producing in paying quantities in December 2016. Well certification is often used to protect an individual lease from expiration but can also be used to protect an entire unit from expiration, so long as the state approves a plan of development with certain work commitments.

The well and the subsequent certification were the culmination of nearly two decades of work. Eager to become an operator in its backyard, Arctic Slope Regional Corp. created a “mentoring” agreement for exploration with BP Exploration (Alaska) Inc. in the 1990s.

Placer was the first project under the agreement. ConocoPhillips Alaska Inc. drilled the Placer No. 1 and Placer No. 2 exploration wells in early 2004. Through a farm-in agreement, ASRC acquired a 35.7 percent working interest in the Placer No. 1



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TOP ALASKA EXECUTIVE: Rex A. Rock, Sr., president and CEO
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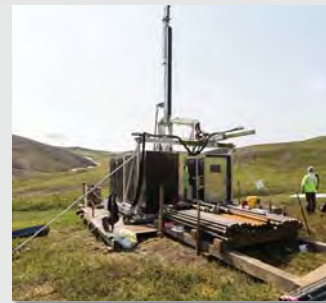
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well.

Despite seemingly promising results from the two-well program, ConocoPhillips and the other partners did not pursue development. But ASRC remained interested. The company acquired the Placer prospect in a March 2006 lease sale, the Placer No. 1 well in June 2010 and a license over an earlier seismic survey of the region by early 2011. It also created ASRC Exploration to operate exploration and development work in the future.

Extension requested

By the time ASRC Exploration acquired the well and the seismic information, its five-year leases were nearing expiration. The company applied to form the Placer unit.

But the state and the company disagreed about the size for the unit. ASRC Exploration wanted an 8,769-acre unit covering four leases. The state approved a 1,480-acre unit covering portions of four leases around Placer No. 1. The company complained, saying that any well drilled at the smaller unit would mimic the results of the existing well.

After years of debate, the state ultimately approved the larger unit boundaries in November 2014 but required the company to post a \$2.5 million performance bond by mid-January 2015 and fulfill commitments culminating in a well by May 2016.

ASRC Exploration completed the 6,380-foot nearly vertical Placer No. 3 well in March 2016, according to Alaska Oil and Gas Conservation Commission well reports.

With the Placer unit set to expire in September 2016, the company asked for a five-year extension, running through September 2021. Department of Natural Resources Commissioner Andrew T. Mack instead approved a two-year extension, saying it would balance the needs of the company with the needs of the state to promote com-

petition.

In its request for the extension, ASRC Exploration had proposed a two-year plan of development at the Placer unit. In the first year, the company would use data from all three Placer wells to determine the “extent, size and continuity of all producible reservoirs,” would initiate facility sharing agreements with Brooks Range Petroleum Corp. and ConocoPhillips Alaska Inc.; would obtain data from the CGG Tabasco 3-D seismic survey and merge it into existing data; and would estimate infrastructure costs.

In the second year, the company would determine future well locations and infrastructure placement and would propose participating areas based on its ongoing reservoir studies.

Pending expiration

In an annual report submitted to the state in June 2017, ASRC Exploration said it had met the major goals described for its first year of activities under the plan of development.

ASRC Exploration completed an initial geologic and engineering study of the Placer No. 3 well. The company also initiated discussions with Brooks Range Petroleum Corp. and expected to enter negotiations with ConocoPhillips in the near future. The company hired ASRC Energy Services to provide cost estimates for development work. And the company received the Tabasco 3-D seismic and was moving toward the merging work.

Attached to the annual report, the company also provided a second plan of development for the Placer unit, detailing activities from September 2017 to September 2018. The program called for a series of projects aimed at “establishing the viability of the Kuparuk C as a commercial reservoir and determining the most efficient way to develop it.”

Division of Oil and Gas Director Chantal

Walsh took issue with elements of the plan.

For starters, ASRC Exploration complained about media coverage of its activities and submitted two versions of its plan — a public version and a confidential version. The state rejected the request for confidentiality, except for those categories covered by statute.

The state and the company also disagreed about the circumstances of the transfer of Tabasco 3-D seismic data. According to ASRC Exploration, the state was slow in transferring the data, resulting in a six-month delay from the timeline in its first plan of development. Once the company obtained the data, it found a small portion missing.

But according to Walsh, ASRC Exploration should not have received the information in the way it did. The state gave the information to Arctic Slope Regional Corp. under the terms of settlement agreements from 1991 and 2017. The agreements allowed Arctic Slope Regional Corp. to share information with employees and contractors, but not with a separate corporation such as ASRC Exploration. “AEX may have obtained the Tabasco seismic data earlier this year, but it did not receive it from the State. And under the terms of the 1991 and 2017 agreements, it should not have received this data from ASRC.”

Walsh claimed the information was complete when the state transferred the data set to Arctic Slope Regional Corp. “The Division is unaware how or from whom AEX obtained this data and thus cannot comment on any issues with the data AEX obtained,” she wrote.

Walsh also challenged the facility sharing update, noting that owners of the Brooks Range Petroleum Corp.-operated Southern Miluveach unit and the ConocoPhillips-operated Kuparuk River unit were not authorized to process oil or gas from other units.

Considering the proposed plan of development, Walsh described the work as “activities, not operations” as described by existing regulations. Without a plan of development that includes approved operations, she noted, a certified well could not be used to extend the term of a unit. “The fact that AEX has proposed no production or operations to extend the unit past September 7, 2018 makes unitized development highly unlikely,” she wrote, referring indirectly to the ability to develop a lease without a unit. Without an amendment to the plan incorporating production or operations, the unit will expire this September. ●



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BlueCrest exploration taking backseat to development

Company focusing on oil development from onshore pad; potential offshore gas exploration seems to be on hold

By **ERIC LIDJI**
For Petroleum News

BlueCrest Alaska Operating LLC is advancing slowly at Cosmopolitan.

The local subsidiary of the Texas-based independent brought the offshore Cook Inlet unit into production in 2016, after three years of work and nearly 50 years of failed attempts by previous operators. But its early development efforts have hit some technical snags, and its exploration plans seem to be on hold, due to market and political conditions.

BlueCrest brought the Cosmopolitan

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The company ultimately did complete five penetrations at the Cosmopolitan unit during the year, but not in the way it had originally intended.

BlueCrest completed the H-16 well in March 2017. By late September 2017, after hydraulic fracturing operations, the well was producing some 330 barrels per day.

development into production from the Cosmopolitan No. 1 well, which the company had helped drill back as an exploration well in 2013 and later converted to development. The company planned to conduct a five-well program in early 2017.

The company began drilling the H-14 well and associated H-14 lateral in mid-March 2017, after completing drilling operations on the H-16 well. But technical problems plagued operations, forcing the company to make three attempts on the H-14 Lower Lateral. The company finally completed the 22,300-foot lateral in late September 2017.

"BlueCrest was running the liner into the H-14 Lower Lateral when the Baker Hughes Packer/Liner Hanger Assembly failed and prematurely & permanently set the liner in the well (-4,000 ft. short of TD (total depth)), the company wrote in filings. "BlueCrest completed a milling/fishing job to recover the liner that was left in the cased hole."

The complex geology at Cosmopolitan is largely to blame. The compartmentalized reservoir requires fracturing operations that are larger than have been usual for Alaska.

Added to those complexities are operational challenges. Cosmopolitan is an offshore reservoir being developed from onshore drilling facilities, requiring long directional wells. According to the company, the H-16 well was the longest extended reach well ever drilled in Cook Inlet — a 22,810-foot well which reached a vertical depth of just 7,089 feet.



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An Aerial view of BlueCrest's Hanson Production Facility in the Cosmopolitan unit, Mt. Iliamna is in the background.

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Going forward

Those challenges are guiding work going forward.

The five-well program BlueCrest had planned for 2017 included the H-16 well, the H-14 well and H-14L lateral, and the H-12 well and H-12L lateral. The complications on the H-14 pair, combined with financial uncertainty after the state withheld promised tax credits, led the company to defer activities on the H-12 pair until an undetermined time.

In its fourth plan of development for Cosmopolitan, approved in late 2017, BlueCrest announced plans to spend the coming year evaluating production from H-16 and H-14.

"Given the complexity of the well completions, it is reasonable for BlueCrest to carefully evaluate its well design and drilling and completion techniques before drilling the next well. This careful consideration can prevent physical and economic waste and maximize ultimate recovery, therefore promoting the

state's and BlueCrest's interest," Division of Oil and Gas Director Chantal Walsh wrote in a Nov. 28 decision approving the plan.

BlueCrest also said it would drill one new well or sidetrack this year, saying it planned to permit the H-16 Upper Lateral and H16 Exploratory Lateral as potential candidates. (The potential exploratory lateral is why BlueCrest is included in The Explorers this year.)

As currently envisioned, the H-16 Upper Lateral would target the Starichkof. Pennzoil discovered Cosmopolitan in 1967 with the Starichkof State No. 1 well. Phillips confirmed the discovery and also discovered Hemlock oil with the Hansen No. 1 well in 2001.

BlueCrest also said that it needed to revise its permits for the H-12 well to account for changes to the completion program, presumably to incorporate lessons learned at H-14.

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Spudding the H16, the first new extended-reach horizontal well in the Cosmopolitan unit.

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BLUECREST continued from page 27

Other exploration

In earlier plans, BlueCrest proposed exploration plans for other sections of the unit.

The company is currently using an on-shore pad near Anchor Point to drill directional wells to an offshore target. But the company has also expressed an interest in using a jack-up to drill vertical wells into shallower oil and gas prospects located farther offshore.

In an application to the U.S. Fish and Wildlife Service in early 2016, the company proposed a three-well exploration program with both offshore and onshore components, but withdrew the application that summer, citing concern about market imbalance in Cook Inlet and frustration over tax policy — specifically Gov. Walker's veto of approved credits. "What (the governor's action) did is create a tremendous distrust of the state's integrity going into the future," BlueCrest President J. Benjamin Johnson said in July 2016. "Unless something is worked out to help the small oil companies work through the payment delay, this is going to have a long term negative impact to the state and will surely come into play as the state tries to obtain financing for new capital programs."

A proposed gas exploration program in partnership with WesPac Midstream LLC remains on hold. The program would also require offshore drilling from a jack-up rig.

In previous plans, BlueCrest also noted that a 3-D seismic program from 2005 "suggests that the southern exploratory blocks potentially have producible hydrocarbon deposits at a deeper depth" that would require "additional evaluation" to determine if the deposits are economically viable. Both the oil and gas developments are focused on leases near the center of the unit, leaving areas to the north and the south for future exploration work.

In particular, the company had identified a prospect worth exploring in the south, located predominately within ADL 391899 and potentially extending into two neighboring leases.

In 2017, BlueCrest contracted ADL 391902 from the unit. The lease was one of the three leases in the north offered in a special sale in June 2011 because of their prospectivity. ●

Contact Eric Lidji at erichlidji@mac.com

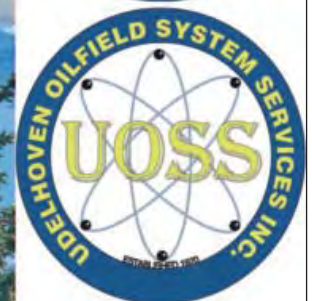
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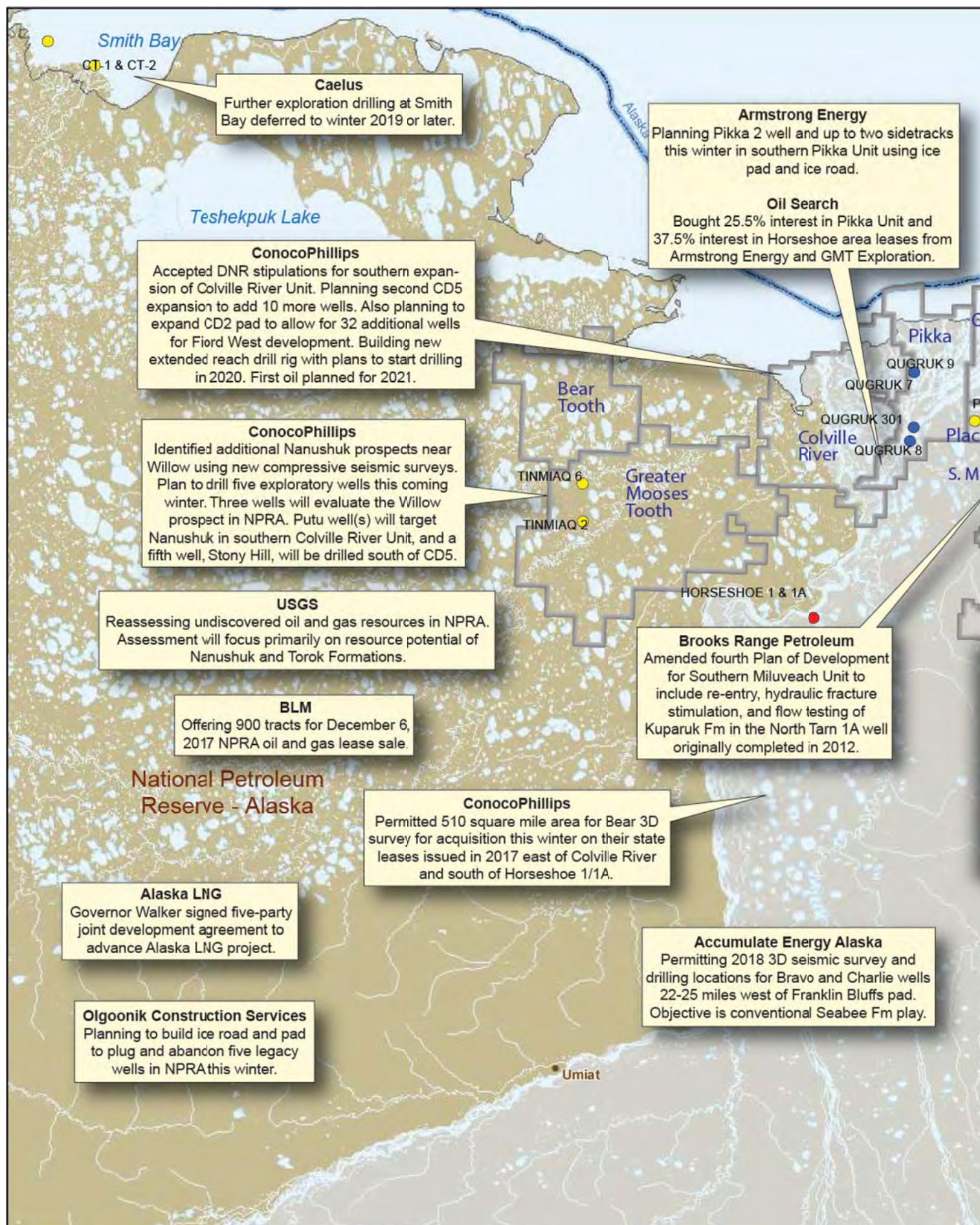
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State of Alaska, Department of Natural Resources,
Division of Oil and Gas, as of December 2017



Beaufort Sea

Eni

Planning to start ERD exploratory drilling at Nikaichuq North prospect mid-December. Plan to flow test and possibly sidetrack well. Second well contingent on results of the first.

Hilcorp

Finished construction at Moose pad. Plan to construct road, pad, and other facilities this winter. First oil expected in 2018.

Hilcorp

Planning to start building gravel island for Liberty project late 2019. First oil possible 2022. Final EIS to be published late 2018. Project to consist of five to eight production wells, four to six injection wells, and up to two disposal wells.

Hilcorp

Planning seven-well development program at Duck Island Unit for 2018.

Exxon Mobil

Plan of Development for Initial Production System was accepted by DNR.

Glacier Oil and Gas

Planning to drill exploratory Starfish well at Badami this winter. Ice road construction scheduled for November to January. Well targets are the Badami and Killian sands (Canning Fm).

U.S. Senate Energy Committee

Voted in favor of lifting ban on oil and gas leasing in ANWR.

Alliance Exploration

Received approval from Division of Oil and Gas to form the Guitar Unit. Plan of Exploration calls for drilling Kuparuk C anomaly noted in the Storms 3D seismic survey and results from the Hemi Springs State 1 well.

ConocoPhillips

Viscous oil development 1H-NEWS on production ahead of schedule. Project includes 4 penta-lateral producers and 15 vertical injectors in West Sak sands (Schrader Bluff Fm).

Working to improve production at existing pads in Kuparuk River Unit and slowly expand facilities designed to target undeveloped areas in unit. Plan to drill four rotary wells and 16 coiled tubing drilling sidetracks by July 2018.

Accumulate Energy Alaska

Planning to re-initiate production test at Icewine 2 in spring 2018 with possibility of drilling follow-up lateral.

Division of Oil and Gas

Tax credit datasets for Storms 3D, Nanuq South 3D, and two Harrison Bay 3D seismic surveys have been publicly released to Alaska Geologic Materials Center. Several additional surveys to be released soon.

Exploratory Wells Spud

- 2017
 - 2016
 - 2015
- Oil & Gas Unit Boundary

0 5 10 15 20 25 Miles

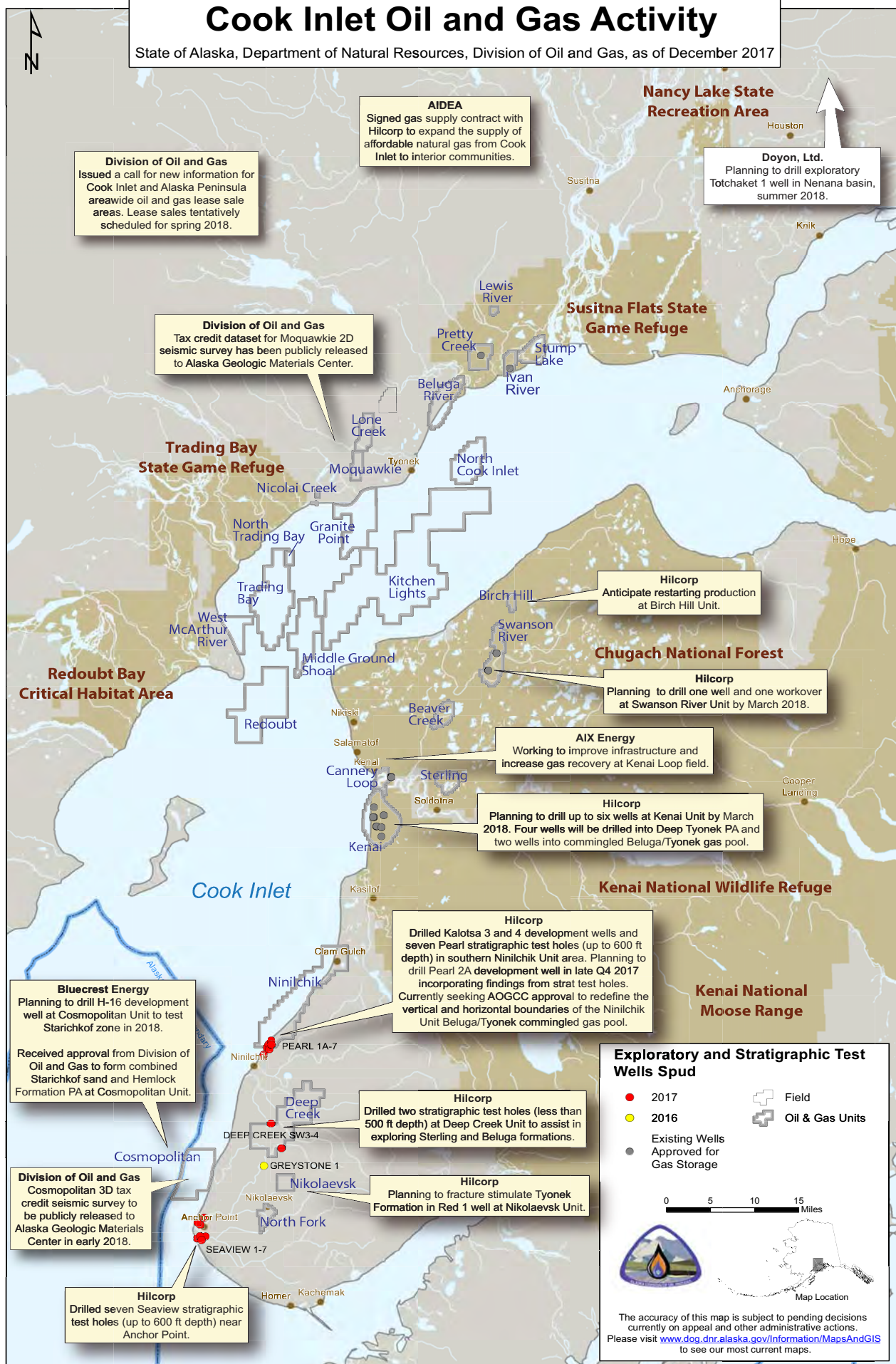


Map Location

The accuracy of this map is subject to pending decisions currently on appeal and other administrative actions. Please visit www.dog.dnr.alaska.gov/Information/MapsandGIS to see our most current maps.

Cook Inlet Oil and Gas Activity

State of Alaska, Department of Natural Resources, Division of Oil and Gas, as of December 2017





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Caelus sitting on a major discovery at Tulimaniq

Two-well program found 6 billion to 10 billion barrels in place, prices and politics have stalled progress

By **ERIC LIDJI**
For Petroleum News

Caelus Energy Alaska LLC is a reminder that finding oil is only part of the challenge of working in Alaska — getting it out of the ground and moving it to market is the other part.

In early 2016, the local subsidiary of the Texas independent made one of the largest recent oil discoveries — Alaska or otherwise — with its two-well Tulimaniq exploration program in Smith Bay off the coast of the National Petroleum Reserve-Alaska.

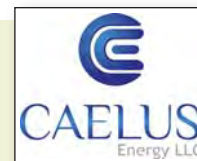
The company announced estimates of 6 billion to 10 billion barrels of oil in place. But Tulimaniq is located in a remote, environmentally sensitive part of the North Slope. The geology suffers from relatively poor reservoir quality. And oil prices have been low.

Caelus wants to return to the region for appraisal drilling, but it deferred an exploration program planned for early 2017 and deferred the program again for this past winter. The company cited



JAMES MUSSELMAN

NAME OF COMPANY: Caelus Energy
COMPANY HEADQUARTERS: Dallas, Texas
TOP EXECUTIVE: James C. Musselman, president and CEO
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WEBSITE: www.caelusenergy.com



low oil prices and uncertainty over production tax policy at the state level.

Quantifying the find

Caelus acquired the assets of Pioneer Natural Resources Alaska Inc. in early 2014.

The centerpiece of the acquisition was the producing Ooguruk unit and its undeveloped Nuna satellite, which Caelus eventually sanctioned but has yet to bring into production.

Caelus also acquired North Slope exploration acreage through lease sales and other deals. The company acquired a 75 percent

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working interest in 26 leases in the Tulimaniq area from NordAq Energy Inc. in June 2015 and built upon existing NordAq permitting activities to quickly plan a two-well exploration program for the following winter season.

The CT-1 and CT-2 stratigraphic test wells were located near the mouth of the Ikpikpuk River, some 59 miles southeast of Barrow. A primary goal of the exploration program was to collect rock samples and to conduct vertical seismic profiling in the wellbores.

Company officials dropped optimistic hints about the program at industry conferences throughout the spring of 2016 and announced plans to return for a third Tulimaniq well.

In October 2016, the company revealed that the two CT wells and earlier seismic data suggested the possibility of 6 billion barrels of oil in place at the Smith Bay leases, with the possibility of 10 billion barrels or more across the complete Smith Bay area.

A field of that size could add some 200,000 barrels per day to the trans-Alaska oil pipeline, which moved just 525,376 barrels per day on average throughout 2017.

In a presentation before the Dallas Desk & Derrick Club in May 2017, Senior Vice President for Business Development Matt Musselman described Tulimaniq as a light oil discovery in a Brookian fan complex covering a 300 square mile area on the North Slope.

A chart included in the presentation provided an estimate of 6.257 billion barrels of oil in place at Tulimaniq and broke the estimate into seven geologic sections: Western Channel 1, Western Channel 2, Central Channel, Lobe 4, Lobe 3, Deep Fan 1 and Deep Fan 2.

The thickest, largest and most prolific was Deep Fan 1, which accounted for 3.345 billion barrels. The next was the Central Channel, which accounted for 948 million barrels.

The chart assumed a 38 percent recovery rate for all seven sections, leading to recovery of 2.378 billion barrels. In previous presentations, the company noted that enhanced oil recovery using natural gas from the field could push recovery rates to 60 or 70 percent.

As described by the company, the Tulimaniq appraisal program would include a well with a short lateral section to help verify the extent of the resource. It would also include a period of flow testing, which was not conducted for the first two stratigraphic wells.

The appraisal program would also begin the process of tackling the geology.

To produce the light oil of the Torok formation from the geologic

“fans” within the Brookian formation, Caelus wants to replicate the mechanical fracturing technology used at Oooguruk. “We’re confident that the rocks here are fine,” Caelus CEO Jim Musselman explained in 2016. “It’s going to require horizontal wells. It’s going to require fracking.”

What will it cost?

The company is estimating \$8 billion to \$10 billion development costs for the project.

A big chunk of that price tag is transportation — \$1 billion for a road from the Colville River unit and \$800 million for a pipeline traversing that same vast expanse of coastline.

Independent processing facilities would also add to the cost. The project is also expected to require four pads and some 400 wells, according to Caelus. By comparison, ConocoPhillips has drilled some 200 wells from five pads at the Colville River unit.

To accommodate those large expenses, the price of oil would probably need to stay in the range of \$60 per barrel for a sustained period, according to the company. The monthly prevailing value of Alaska North Slope crude oil passed that threshold in November 2017 for the first time since June 2015, according to the Alaska Department of Revenue.

Other leads

Prior to the Smith Bay acquisition, Caelus had already acquired more than 350,000 acres of exploration leases on the eastern North Slope, between Prudhoe Bay and Badami.

The company acquired some 167 square miles of 3-D seismic over the region in 2015 and later some reprocessed 272 square miles of 3-D seismic. The seismic program “found some really exciting turbidite fans,” according to Senior Vice President Pat Foley.

The fans of the Brookian formation present similar challenges to Tulimaniq, although in a relatively less isolated setting. The company also referred to some possibilities worth evaluating in an older and deeper sequence in the region known as the Ellesmerian.

In the May 2017 presentation, Musselman noted that the region contained “multiple source rocks, plays and leads” and two “drill-ready prospects,” Denali and Silverthrone. ●

Contact Eric Lidji at ericlidji@mac.com



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ConocoPhillips advancing on three exploration fronts

Company planning delineation program at its Willow discovery, plus plans for Putu south of Alpine and Stony Hill near Nuiqsut

By **ERIC LIDJI**
For Petroleum News

North Slope progress was defined for decades by the westward advance of exploration activity. And no company moved west more vigorously than ConocoPhillips Alaska Inc.

Today, the greatest advance of North Slope exploration is geologic, not geographic, as companies are targeting the Nanushuk formation, often on leases near infrastructure.

ConocoPhillips is pursuing that opportunity as well, creating a winter program where the company could drill as many as eight penetrations across three distinct prospects.

The company planned to use Doyon Rig 141 to drill as many as four penetrations at the Willow prospect, the Arctic Fox rig to drill as many as two penetrations at the Stony Hill prospect and the Kuukpik 5 rig to drill as many as two penetrations at the



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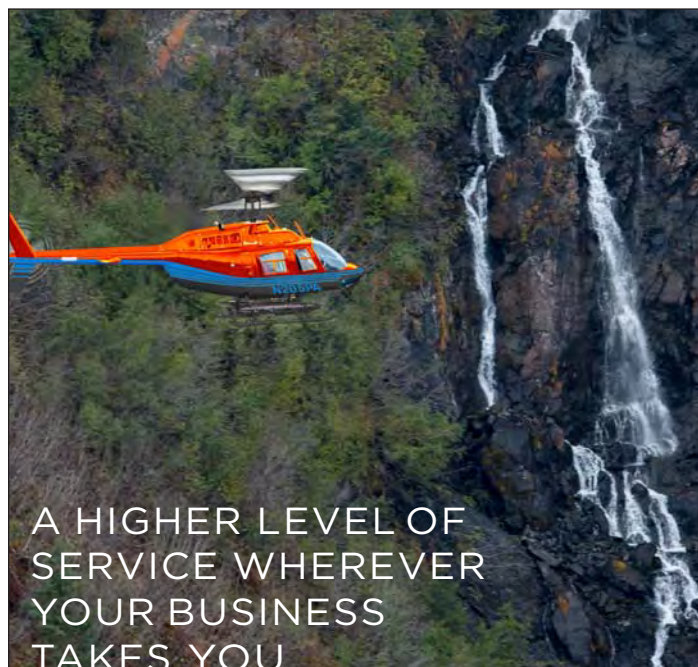
COMPANY WEBSITE: www.conocophillipsalaska.com

ConocoPhillips

Putu prospect.

The company also commissioned a 3-D seismic survey over approximately 250 square mile of state acreage acquired in a lease sale in December 2016. Before announcing its discovery at the Willow prospect, the company acquired 65 tracts covering 594,972 acres in a federal lease sale and 74 tracts covering 142,280 acres in a nearby state lease sale.

Altogether, the program is the busiest for ConocoPhillips since 2002, in the early years of the current phase of exploration



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Located about three miles east-northeast from Nuiqsut, Kuukpik 5 rig at Putu during sunset.

activity in the National Petroleum Reserve-Alaska.

Tinmiah and West Willow

The Willow discovery emerged from ongoing work at the Greater Mooses Tooth unit.

The step-out strategy ConocoPhillips has employed at the Colville River unit also applies to Greater Mooses Tooth, even though the two units are administratively distinct. The idea is to gradually expand existing developments by exploring close to existing infrastructure and by managing new developments against existing processing capacity.

This strategy has divided Greater Mooses Tooth into three potential developments to date. The GMT-1 project is in the east of the unit. The GMT-2 project is central.

ConocoPhillips drilled the Tinmiah No. 2 and Tinmiah No. 6 exploration wells in the western end of the unit in early 2016. A test of Tinmiah No. 2 produced 3,200 barrels per day of light 44 degree API oil over a 12-hour period, according to the company.

In mid-January 2017, ConocoPhillips announced a discovery at the newly named Willow prospect totaling some 300 million barrels of recoverable oil. At issue now is how to de-

continued on next page



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Road access is one of the greatest challenges to development on Alaska's Western North Slope; ice road construction at Willow.

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CONOCOPHILLIPS *continued from page 37*

velop the massive prospect, either as another Alpine satellite or as a standalone project with independent facilities. A satellite would likely produce no more than 40,000 to 50,000 barrels per day while an independent field could reach 100,000 barrels per day.

One goal of the Willow program this year is to help ConocoPhillips decide which strategy to take. The Alaska Oil and Gas Conservation Commission issued permits on Jan. 4 for ConocoPhillips to drill the Tinmiaq No. 7, Tinmiaq No. 8 and Tinmiaq No. 9 wells and a permit on Jan. 10 for the company to drill the West Willow No. 1 well.

ConocoPhillips completed the 4,035-foot Tinmiaq No. 7 well on Feb. 22, according to the AOGCC. The status of the other

wells was unknown as The Explorers went to print.

ConocoPhillips previously expressed its hopes of bringing the three Greater Mooses Tooth developments online within the next five years. The company expects to bring GMT-1 online later this year. GMT-2, if sanctioned, could come online in late 2020. Willow could come online as soon as 2023, barring permitting and regulatory delays.

Putu

The Putu program is targeting two prospects south of the Alpine field.

The Putu No. 2 well will "evaluate the reservoir and hydrocarbon potential of the western prospect, provide control for

continued on page 40



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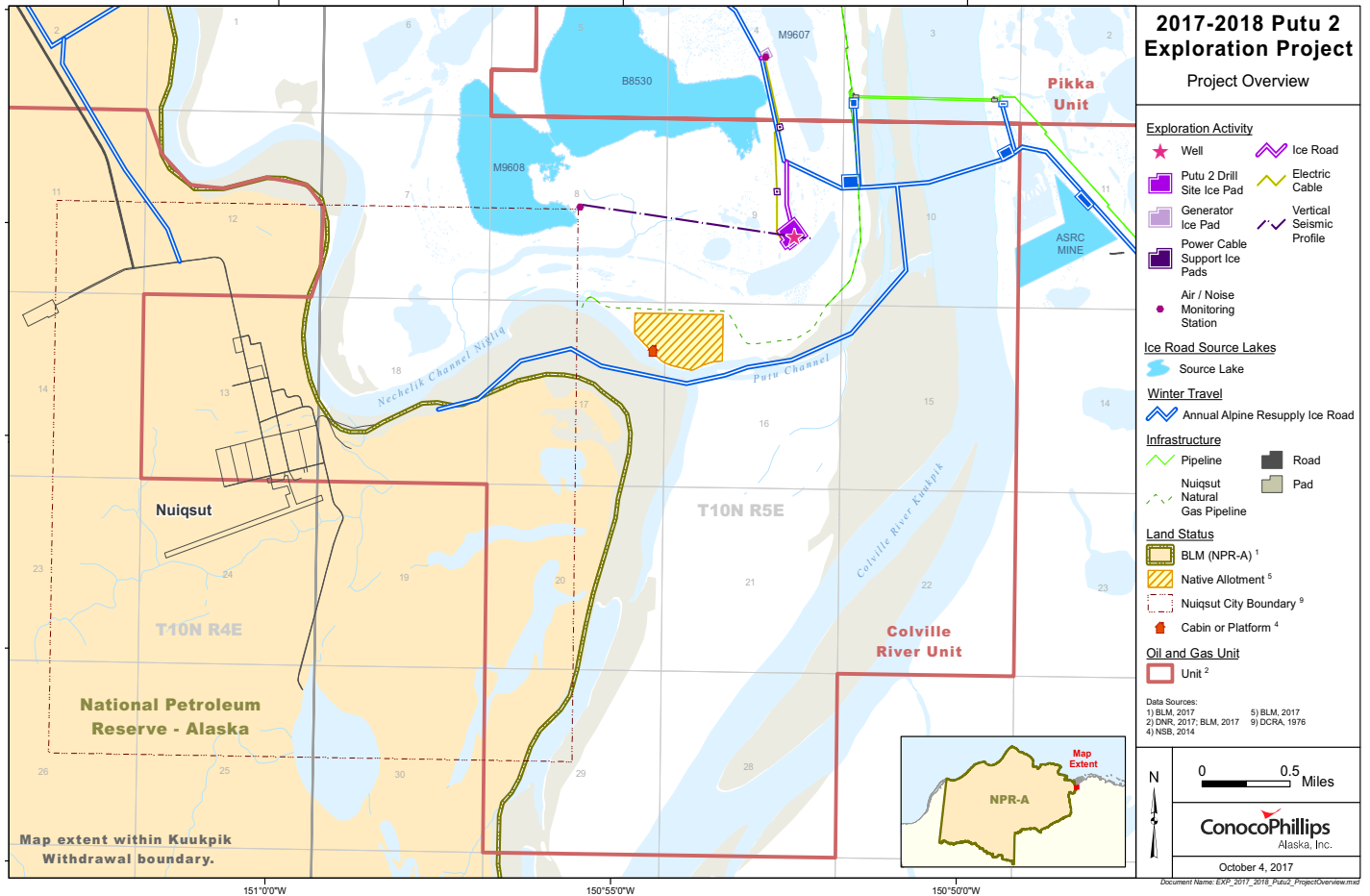
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picking core point for the Putu No. 2A well, if needed, and increase the accuracy of the velocity model for depth prediction,” the company wrote in an amended plan of development submitted to the state Division of Oil and Gas in late November. The company would also drill the Putu No. 2A sidetrack to evaluate “the eastern prospect,” although information gained from the first well could prove sufficient.

ConocoPhillips cancelled the Putu No. 1 well last winter after meeting with local leaders in Nuiqsut, according to the company. The company said it “actively engaged the Nuiqsut community ahead of the exploration season to ensure that the Putu drilling project is well understood, and questions from the community are addressed.” The AOGCC issued permits on Jan. 4 for ConocoPhillips to drill Putu No. 2 and No. 2A and had yet to report on the status of either well by the time The Explorers went to print.

Under the terms of an agreement with the Alaska Department of Natural Resources, ConocoPhillips must drill one well this year and a second well by 2020 at the Putu prospect to retain the leases. The agreement resolved a longstanding dispute between the company and the state over the status of the leases south of the Colville River unit.

ConocoPhillips first asked the state to expand the Colville River unit to include acreage to the south in 2002. The state agreed to the expansion but eventually contracted the acreage out of the unit in 2004 after ConocoPhillips failed to meet a drilling commitment.

The company referred to the expansion acreage at the time as the Titania prospect. A joint venture operated by Brooks Range Petroleum Corp. subsequently acquired the acreage through a



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lease sale and began referring to the leases as the Tofkat prospect.

Brooks Range Petroleum encountered hydrocarbons on the leases in early 2008 with the Tofkat No. 1 well and two sidetracks and later formed the Tofkat unit in October 2011.

The state terminated the unit in late March 2016, after the company missed work commitments. The termination proceedings came as ConocoPhillips was acquiring the acreage and eventually asking the state to incorporate it into the Colville River unit.

The state was hesitant to approve the expansion, first because of the atypical status of the leases and then because of ConocoPhillips’ previous failure to explore the acreage.

The state ultimately agreed to approve the expansion if ConocoPhillips provided an unusually large series of guarantees including a \$2.5 million performance bond for an exploration well, a \$10 million performance bond to guarantee oil production from the area within the next five years and a \$1.5 million “bonus bid replacement payment” to compensate the state for theoretical losses it might incur by not re-leasing the acreage.

The state ultimately agreed to reconsider the ruling, leading

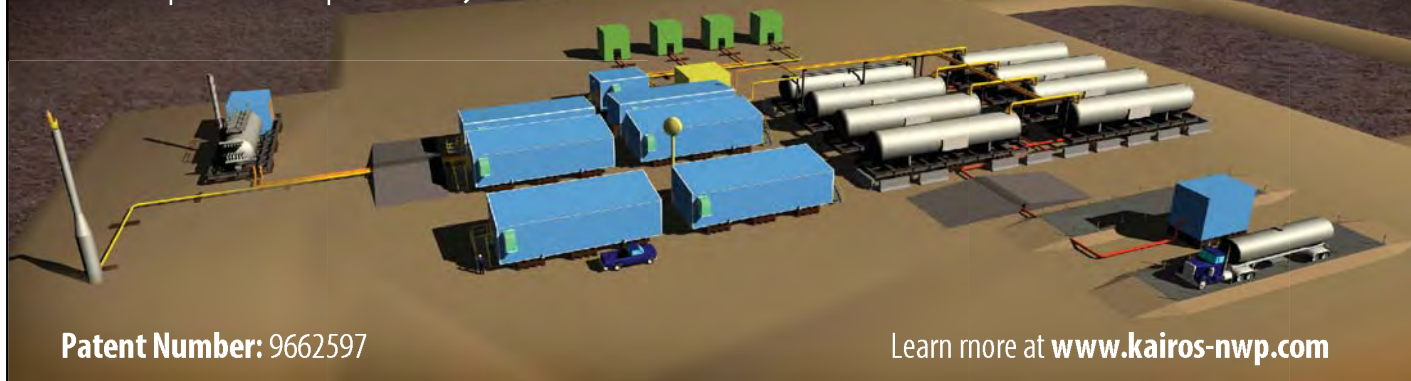


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to the current deal.

Stony Hill

ConocoPhillips announced its exploration programs at Willow and Putu well in advance of the season. The third program, at the Stony Hill prospect, emerged later in the year.

The company planned to drill the Stony Hill well some six miles south of Nuiqsut, almost directly across the Colville River from the Horseshoe well drilled by Armstrong in 2017.

The AOGCC issued permits on Jan. 18 for ConocoPhillips to drill the Stony Hill No. 1 well and Stony Hill No. 1A sidetrack on federal lease AA-00093131 and had yet to report on the status of those wells when The Explorers went to print. ConocoPhillips had previously staked a Stony Hill No. 1 well on AA-081775 in the summer of 2007.

In November 2017, ConocoPhillips executive Matt Fox said the company had identified "a lot" of Willow lookalikes in the Nanushuk and "every one of them we've drilled so far has had oil in it, so we're hopeful that several of these Willow lookalikes will deliver." ●

Contact Eric Lidji at erclidji@mac.com

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A member of the seismic crew places highly sensitive receivers along a pre-determined grid. The receivers capture and record energy waves as they reflect off geological layers. The data is used to later create an image of the subsurface that helps locate oil and gas resources.

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Doyon plans to drill fourth Nenana well this summer

Alaska Native corporation is targeting oil in the northern end of the basin; sees potential at \$50 oil

By **ERIC LIDJI**
For Petroleum News

The exploration activities of Doyon Limited in the Nenana basin have been marked by two recurring features over the past 20 years: inner persistence and outer obstacles.

The Alaska Native corporation for the Interior region is planning to return to the Nenana basin this coming summer to drill its fourth well in the region in the past decade. The three previous wells followed a decade of start and stop efforts by private sector partners.

The upcoming drilling activity comes as changes in the world of Fairbanks utilities could upend natural gas supplies, forcing Doyon to shift its attention toward oil resources.

Working in partnership with Cook Inlet Region Inc., Doyon plans to drill the Totchaket No. 1 well this summer in the northern end of the Nenana basin. The proposed well would follow



JAMES MERY

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PHONE: 888-478-4755 • **COMPANY WEBSITE:** www.doyon.com



the Nunivak No. 1 well from 2009, Nunivak No. 2 well from 2013 and Toghotthele No. 1 well in 2016. Totchaket is based partly on the results of a 64-square-mile 3-D seismic survey from 2016-17. The survey followed large 2-D surveys in 2005 and 2012, a targeted 3-D survey in early 2015 and a targeted 2-D survey in early 2016.

An oil discovery at Totchaket in the range of 40 million to 60 million barrels would be viable with oil prices at \$50 per barrel, Senior Vice President for Lands and Natural Resources James Mery told the Resource Development Council in January 2018.

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An oil discovery of that size could be brought into production between 2023 and 2025, and possibly even sooner if the company decided to ship oil to Interior markets by rail or road, he added. And a natural gas discovery could potentially come online even sooner (although Doyon is currently skeptical about gas sales, given the state of the market).

The recent 3-D seismic survey identified five prospects in the northern end of the Nenana basin. Doyon plans to drill the approximately 13,000-foot Totchaket No. 1 well into the Totchaket East prospect. The company is particularly interested in indicators at 4,500 feet and 9,500 feet. The results of the well could spur a multiyear drilling program in the area.

Geology

The three previous wells were all non-commercial for oil and for natural gas. But all three yielded intriguing results that convinced Doyon to continue with its exploration program.

The Nunivak No. 2 well, for example, penetrated several hundred feet of gas-saturated sand. But the pressure of the reservoir proved to be too low to support commercial production. Doyon blamed the low pressure on a failed hydrocarbon trap. With better geology, the reservoir could have produced some 150 billion to 180 billion cubic feet of gas, according to the company, enough to supply Fairbanks for more than 25 years.

The gas encountered in the well also included propane, which suggested a thermal origin — rather than a biogenic origin — and therefore the possibility of oil in the basin.

The Toghotthele No. 1 well supporting that oily hunch by encountering several dozen oil shows, suggesting that oil had flowed through the region without forming a reservoir.

The Nenana basin is shaped like an hourglass with a relatively shallow saddle in the central part of the basin near Nenana and deeper sections to the north and the south.

Doyon drilled its three earlier wells in the central saddle, hoping to find hydrocarbons that had migrated up from the deeper sub-basins. Recent seismic pointed to promising geology in the deeper of the two sub-basins, located north of the three previous wells.

The goal of the 3-D seismic survey completed in 2017 was to refine leads identified during the 2-D seismic survey conducted in the northern part of the basin in 2016. “The exceptional data quality from last winter’s 64-square mile 3-D seismic program coupled with our initial interpretation and review has resulted in the identification of several new and additional leads, compared to what we had expected,” Mery said in August 2017. “We are encouraged by this positive development with our Nenana basin program.”

The additional leads convinced Doyon and its partner Cook Inlet Region Inc. to delay tentative plans to drill as early as the winter of 2017-18 in favor of a summer well.

“We see multiple prospects at several horizons,” Mery said in late November 2017.

Working in partnership with Cook Inlet Region Inc., Doyon plans to drill the Totchaket No.

1 well this summer in the northern end of the Nenana basin. The proposed well would follow the Nunivak No. 1 well from 2009, Nunivak No. 2 well from 2013 and Toghotthele No. 1 well in 2016.



On Location

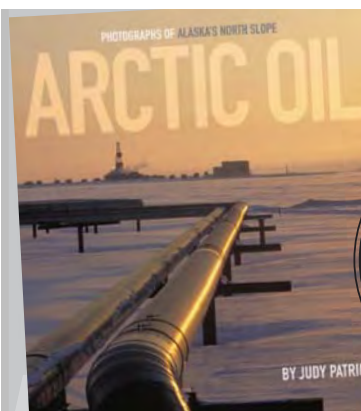
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continued on next page

Totchaket No. 1 is designed to penetrate the Grubstake, Sanctuary and Healy Creek formations, primarily targeting light oil but also looking for gas. The primary source of hydrocarbons appears to be coal seams in the basin. The characteristics of the seams appear conducive to both oil and gas. Doyon plans to use Nabors 105 rig to drill the well at a site north of the confluence of the Nenana and Tanana rivers, approximately 10 miles west of the Parks Highway. The summer schedule will allow the company to access the site by barge from Nenana, some 20 miles south. An access road less than a mile long, built during the winter construction season, will connect the barge landing to the pad.

The prospect covers state of Alaska leases with Doyon-owned subsurface rights.

Obstacles

In the past 20 years, no company has pursued a target outside of the two major Alaska basins with more persistence than Doyon has pursued its target in the Nenana basin.

The untraditional status of the project has occasionally led to complications.

A joint venture led by Andex Resources LLC acquired an exploration license in the Nenana basin in 2002, additional leases in 2003 and the first 2-D seismic survey in 2005. But the joint venture suspended the exploration project in 2006 and 2007 during debates over the Petroleum Profits Tax and terms for a potential North Slope natural gas pipeline.

Those legislative negotiations failed to accommodate the particular needs of the Interior, and Andex Resources abandoned the

project before the state rectified the oversight.

Doyon successfully applied for an extension of the license, through 2012, and assembled a new five-party joint venture led by Denver-based independent Babcock & Brown Energy, which was later renamed Rampart Energy Co. The partnership drilled the 11,100-foot Nunivak No. 1 in mid-2009. The roughly \$15 million well failed to find commercial volumes of gas but the result of the well nevertheless intrigued Doyon.

Uncertainty plagued the project again when the state backed a plan to bring North Slope liquefied natural gas to the Interior and to unify the regional electrical grid.

The four partners lost interest. Doyon decided to continue pursuing results it found interesting. Working alone, it commissioned a 2-D seismic survey in the northern end of the basin in early 2012 and drilled the 8,667-foot Nunivak No. 2 well in mid-2013.

Doyon continued the program independently for the 3-D seismic survey in 2015 but partnered with CIRI for the 11,379-foot Toghothle No. 1 well in mid-2016.

Interior consolidation

The newest challenge involves changes to the natural gas market in Fairbanks.

In December 2017, the Alaska Industrial Development and Export Authority agreed to sell Pentex Alaska Natural Gas Co. to the Interior Gas Utility. If the sale closes, it would consolidate the two existing utilities in Fairbanks into one locally controlled company.

The merged entity would own the Titan liquefied natural gas plant near Point Mackenzie, a trucking operation for transporting the LNG to Fairbanks and a local distribution grid.

Pentex is currently building a 5.25 million gallon liquefied natural gas storage facility in Fairbanks and expects the project to be completed in the fall of 2019. An associated supply contract with Hilcorp Alaska LLC is expected to meet the needs of the project.

"Although our primary target is oil, our gas prospects are greater," Mery said in December 2017. "So it is unfortunate timing to see the Interior Gas Utility ready now to commit to a course of action with AIDEA which will tie Fairbanks for at least a generation to imported LNG by truck at much less favorable price projections. This potential IGU purchase also eliminates the option for use of future Nenana gas as well as foreclosing future opportunities to tap into any North Slope gas export line."

The newest challenge involves changes to the natural gas market in Fairbanks.

Yukon Flats

Doyon also owns about 1.5 million acres of subsurface lands in the Yukon Flats area north of Fairbanks and believes the geology of the region is similar to the Nenana basin.

The program was delayed for five years as Doyon and the U.S. Fish and Wildlife Service tried to negotiate a land swap in the region. The effort failed, although Doyon later determined that its existing acreage was more promising than it had originally thought.

The Nenana project has taken precedence, and the only exploration in the Yukon Flats was a 3-D seismic survey in the Stevens Village region in the winter of 2012 and 2013. ●

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Eni returns to exploration with Nikaitchuq North No. 1

The company hopes that the wildcat well on federal leases north of the Nikaitchuq unit can double its existing resource base

By **ERIC LIDJI**
For Petroleum News

Eni US Operating Co. Inc. returned to Alaska exploration after an 11-year hiatus.

The local subsidiary of the Italian-based major spud the Nikaitchuq North No. 1 exploration well in late December 2017 in the waters north of its offshore Nikaitchuq unit. The company said that it expected operations on the 35,000-foot ultra-extended reach well to last between 70 and 80 days — suggesting an end to operations in March.

By the start of April, Eni had yet to release results from the program and the well had yet to appear on weekly Alaska Oil and Gas Conservation Commission completion reports.

Rather than build a new offshore drilling site, Eni drilled Nikaitchuq North No. 1 from its existing Spy Island drill site using Doyon Rig 15. According to published plans, the well had a vertical depth of 8,131 feet and a measured depth of 34,150 feet. “It will be the longest extended reach well in the state,” Eni U.S. Vice President for Environment and Quality Whitney Grande told the Resource Development Council in November 2017.

Eni previously said that the results of Nikaitchuq North No. 1 would determine whether the company would also drill a sidetrack this winter and would return to drill a Nikaitchuq North No. 2 well next winter. The proposed follow-up would have a vertical depth of 8,329 feet and a measured depth of 38,173 feet. The overall results of the Nikaitchuq North program are expected to guide Spy Island activities for years to come.

The Nikaitchuq North No. 1 well was

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February 2017 and received approval from the federal Bureau of Ocean Energy Management for its Nikaitchuq North exploration plan in July 2017.

Development work

Regardless of the results, the exploration program represents a strategic shift for Eni, which has focused on expanding its


existing development since arriving in Alaska.

Aside from a brief foray on the Kenai Peninsula in the 1960s through its sub-

continued on next page



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subsidiary Agip Petroleum, Eni started its tenure in Alaska in 2005, when it acquired a minority interest in several North Slope prospects from Armstrong Alaska Inc. Those assets included three offshore prospects in the Beaufort Sea — Nikaitchuq, Tuvaq and a stake in Oooguruk — and two onshore prospects on the central North Slope — Maggiore and Rock Flour.

Within a few years, Eni had acquired the outstanding interest in most of those properties, with the notable exception of Oooguruk, where it retained a 30 percent working interest.

Like many new Alaska operators, Eni retained exploration and development prospects at first, but shifted its focus after early exploration setbacks and development successes.

The company drilled explorations wells at Maggiore and Rock Flour in 2007 but relinquished both prospects in 2010. The following year, the company farmed-out its North Tarn prospect, near the Kuparuk River unit, to Brooks Range Petroleum Corp. (The prospect is now the long-delayed Mustang field at the Southern Miluvec unit.)

Eni retained its interest in the Oooguruk unit. Pioneer Natural Resources Alaska Inc. brought the unit online in 2008 and later sold it to Caelus Natural Resources Alaska Inc.

Being a minority partner at Oooguruk provided Eni with a learning experience about Arctic operations and the particular challenges of working in Alaska. The company merged the Nikaitchuq and Tuvaq prospects into a single unit, and, in January 2008, it sanctioned a \$1.45 billion development program at the expanded Nikaitchuq unit. The company brought the unit into production in February 2011, after a yearlong delay that appeared to have been caused primarily by poor weather and a missed Arctic sealift.

By adding reserves at Nikaitchuq, and increasing oil production, Eni would be able to take advantage of significant spare capacity at the Nikaitchuq production facilities.

Eni always planned two initial development phases for Nikaitchuq: an onshore program from the Oliktok Point Pad and an offshore program from the new Spy Island Drillsite.

The company completed its initial drilling program from the Oliktok Point Pad in October 2012 and launched a continuous drilling program from Spy Island in November 2012 using Doyon Rig 15. The Spy Island program continued until December 2015, when the company suspended drilling operations at Nikaitchuq due to low oil prices.

Eni also undertook several ventures designed to improve production.

One set of activities involved expanding the capabilities of existing wells and improving new well design. Between mid-2013 and May 2014, the company added eight laterals to a selection of wells it had already drilled from the Oliktok Point Pad. In early 2013, the company drilled its first multilateral well at Nikaitchuq — a Spy Island Drillsite well with four laterals. In the third quarter of 2013, the company began adding a second lateral to all new production wells being drilled from the Spy Island drill site, which yielded five dual lateral wells by the time the company suspended drilling operations in late 2015.

A second set of activities may have inspired the current exploration program. These activities involved a geographic expansion of development. Between the third quarter of 2014 and the




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Spy Island drill site is located offshore about 4.5km from the coast in Harrison Bay.

start of 2015, Eni drilled two dual lateral producers and two single lateral injectors west of the Spy Island Drillsite as part of the West Extension Project. The company launched the East Extension Project in the third quarter of 2015, but only completed one dual lateral producer before it suspended ongoing development activities.

The company also evaluated plans to target new formations, beyond the Schrader Bluff OA Sands. A pilot well drilled into the Schrader Bluff N sands did not lead to further activities. Discussions of a Sag River program never culminated in activities either.

In the course of those initial development activities, though, Eni drilled a 25,000-foot at Nikaitchuq. The extended reach well provided the company a real-life learning experience for the current Nikaitchuq North project. "So we're using that same best practice, that same technology and moving it out to reach this federal lease," Grande said.

Objectives

The Nikaitchuq North project follows the logic of the earlier

continued on next page

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ENI continued from page 47

West and East Extension projects by pushing exploration (and potentially development) activities to the north.

But aspects of the northward move suggest a more pronounced shift in strategy than those earlier expansion efforts. For starters, the Nikaitchuq North project involved a major change to drilling infrastructure. Eni upgraded Doyon Rig 15 to accommodate ultra-extended reach wells, increasing top drive torque to 72,000 foot pounds from 63,000 foot pounds and increasing the pressure rating for the drilling mud manifold, according to Eni.

In early 2017, Eni released and demobilized Nabors Rig 245, which had been drilling wells at the unit since at least early 2010. It also contracted the new Nordic Calista Rig No. 4, which is more suitable for workover activities than for development drilling.

Given the lack of previous drilling in the offshore region, Grande described Nikaitchuq North No. 1 as a wildcat. But he also expressed a company hope that the well would discover new oil resources that could potentially double the resource base at Nikaitchuq.

By adding reserves at Nikaitchuq, and increasing oil production, Eni would be able to take advantage of significant spare capacity at the Nikaitchuq production facilities.

The standalone processing facilities at Nikaitchuq currently handle some 20,000 to 25,000 barrels per day but have a capacity of 40,000 barrels per day and could be expanded to 50,000 barrels per day, Grande told the Resource Development Council. ●

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Furie still favoring development at Kitchen Lights

Company is evaluating whether to drill the Kitchen Light Unit No. 6 exploration well into the deep Jurassic this summer

By **ERIC LIDJI**
For Petroleum News

The Kitchen Lights unit is the largest in the Cook Inlet basin, and its size requires a combination of development at producing wells and exploration in other corners.

The balance of those activities has changed from year to year, as Furie Operating Alaska LLC works within internal resources and within regulatory and market constraints.

As of early April 2018, Furie was planning to use the coming year to complete its Kitchen Lights Unit No. A1 well and workover its Kitchen Lights Unit No. 3 well. The company was also evaluating plans for a Kitchen Lights Unit No. 6 exploration well.

Those plans are similar to previous plans from the company.



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By the time The Explorers went to print, it was unclear whether the new plan would resolve concerns from the state.

Alaska Department of Natural Resources Commissioner Andrew T. Mack placed Kitchen Lights in default in late December 2017, citing an ongoing failure to meet work commitments going back to 2015. A default can lead to termination or contraction if left uncured. In this case, the cure means the KLU No. A1 well

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Furie Operating Alaska's Julius R Platform produces more than 13 million cubic feet of natural gas. The company was issued a default notice by the state in December 2017 citing a failure to meet plan developments for its Kitchen Lights Unit.



COURTESY OF FURIE OPERATING ALASKA

FURIE *continued from page 49*

and drilling a second well.

Even with the default, the state approved the newest plan of development for Kitchen Lights. In the plan, running through Jan. 4, 2019, Furie committed to completing KLU No. A1 and to

completing one of three projects: drilling one new development well from the Julius R. platform, drilling the KLU No. 6-Deep Jurassic exploration well or deepening the existing KLU No. 4 well. Division of Oil and Gas Director Chantal Walsh approved the plan but reiterated concerns about missed worked commitments in the past and required the company to file bi-annual work commitment updates throughout 2018.

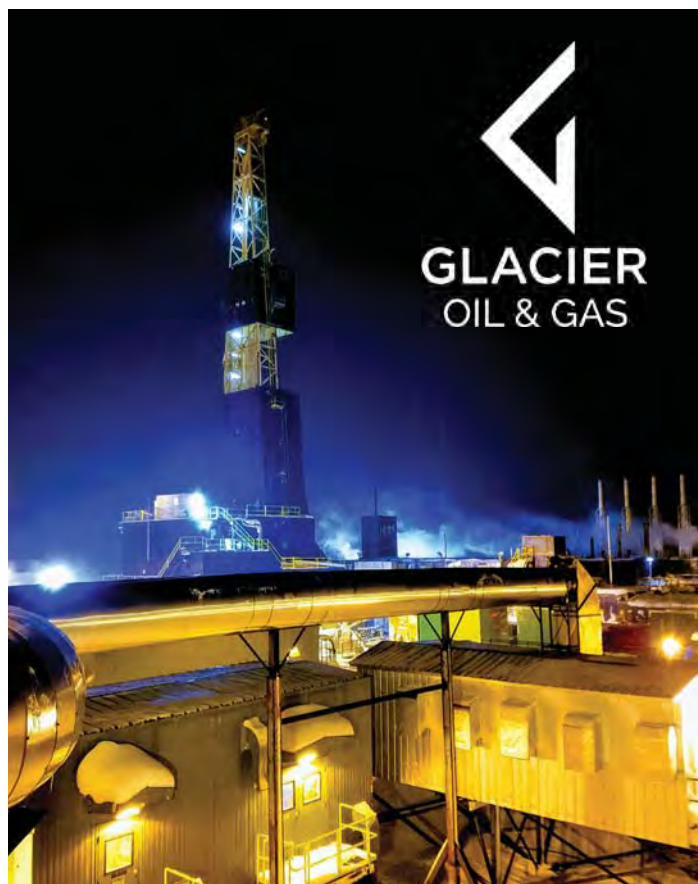
Furie challenged some the state assertions, noting that it drilled three wells in 2016 and only failed to drill in 2017 because the state withheld tax credits owed to companies. In its letter, Furie also described a strategy at Kitchen Lights where the results of its drilling activities from one year have directly influenced its work program for the following year, such as its decision to focus on development work after its successful KLU No. 3 well.

KLU-6

In recent years, those activities have favored development over exploration.

Given the size of Kitchen Lights, the state has demanded ex-

continued on page 52



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ploration to justify holding acreage. The 83,394-acre Kitchen Lights unit brought together three smaller prospects in the water of Cook Inlet and divided the unit into four exploration blocks: Corsair, North Central and Southwest. All development to date has occurred in the Corsair block.

Early plans of exploration for Kitchen Lights required Furie to drill at least one well in each block. Furie drilled KLU No. 1 in 2011 and 2012, KLU No. 2 and KLU No. 2-A in 2012 and KLU No. 3 in 2013.

All four penetrations were in the Corsair block. Over the end of the 2013 season and the beginning of the 2014 season, Furie drilled KLU No. 4 in the North block. At the end 2014, the company drilled KLU No. 5 in the Central block.

Activity then shifted toward development, leaving the Southwest block unexplored. The company installed its Julius R. platform and its subsea pipeline and completed its onshore production facility in 2015. In 2016, the company drilled the KLU No. A2 well, completed the KLU No. A2 sidetrack and started drilling the current KLU No. A1 well.

As it completed those activities, Furie also proposed an exploration program. A plan of exploration submitted in early 2016 called for drilling KLU No. 9 and KLU No. 12 in the 2017 season, KLU Osprey and KLU Deep Jurassic in 2018, KLU No. 10 and KLU No. 11 wells in 2019, KLU No. 6 and KLU No. 8 in 2020 and KLU No. 7 in 2021. The locations of those well moved from the northern end of the unit toward the southern end of the unit and included proposed depths ranging from 7,230 feet to some 24,000 feet.

The current exploration plans evolved from an amendment that Furie proposed to its plan of development in mid-2017. The amendment created the current commitment to drill a new development well at the unit and either deepen the existing KLU No. 4 well in the North block or drill the KLU No. 6-Deep Jurassic exploration well in the Corsair block.

The company drilled and completed KLU No. 4 in 2013 and 2014 and said at the time that the well "encountered potential oil and gas reserves." The company proposed deepening the well to target the Sunfish Channel in a plan of development in late 2015.

Earlier in 2017, Senior Vice President Bruce Webb said that Furie planned to drill the proposed KLU No.6 Deep Jurassic well to a depth of more than 20,000 feet using the Randolph Yost jack-up drilling rig, after the rig completed work on the KLU No. A1 well.

The plan of development called for completing all the work commitments by the end of November 2017, which would roughly equate with the close of the open water season.

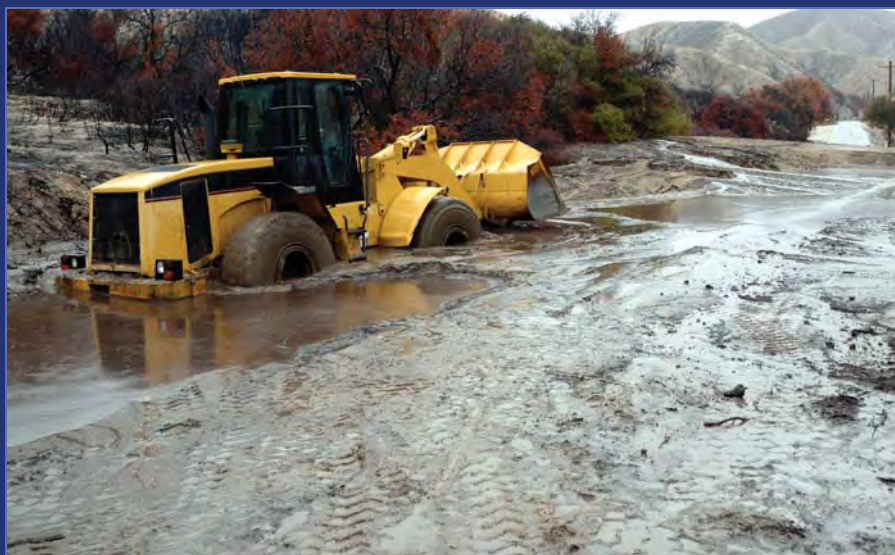
The company didn't follow through on those plans in 2017, citing the tax credit issue.

In an email to Petroleum News in March 2018, Webb wrote that the company was still evaluating its plans for the KLU No. 6 exploration well. The summer well would use the Randolph Yost jack-up to target the deep Jurassic. The well would be in the Southwest block, which would resolve the outstanding commitment.

Before that, though, the company plans to complete the KLU No. A1 well to meet the terms of a gas supply agreement with Enstar Natural Gas Co. and to workover the KLU No. 3 well to increase gas production by adding perforations to the Beluga formation. ●

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An aerial view of Glacier's West McArthur River unit located on the west side of Cook Inlet. Cumulative gas production for the unit through June 2017 was more than 3.8 billion cubic feet.

Glacier planning exploration projects in two basins

Company wants to test the Starfish project at Badami and wants to return to the Sabre prospect at West McArthur River

By **ERIC LIDJI**
For Petroleum News

Having passed through a period of cautiousness following its bankruptcy reorganization, Glacier Oil & Gas Corp. is returning to the inherent uncertainty of Alaskan exploration.

The company is even using poker metaphors.

Speaking to the Alaska Support Industry Alliance in September 2017, CEO Carl Giesler likened his company's three key plays to the three cards in a hand of Texas Hold 'Em.

The oil development at the Redoubt unit is "face up," so to



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speak. It is online and seeing results from a combination of drilling, fracturing and waterflood, according to Giesler.

The two "face down" cards are the proposed Sabre exploration well near the West McArthur River unit and the proposed

continued on next page

GLACIER *continued from page 53*

Starfish exploration well at the Badami unit.

Those are the first exploration projects for Glacier since the company emerged from the bankruptcy of predecessor Miller Energy Resources Ltd. in early 2016. Through its subsidiaries Cook Inlet Energy LLC and Savant Alaska LLC, Glacier operates the West McArthur River unit and the Redoubt unit on the west side of Cook Inlet, the North Fork unit in the southern Kenai Peninsula and the Badami unit on the eastern North Slope.

Glacier currently has no exploration plans for the Redoubt unit or the North Fork unit.

Starfish at Badami

Glacier believes that the Starfish project could influence its direction as a company.

The location of the prospect in the eastern North Slope creates the opportunity to expand operations without significant infrastructure demands. "If this well works close to what we think it will, it should open five to seven more prospects similar to it," Giesler said.

The processing facilities at the Badami

unit are only handling some 1,000 barrels of oil per day but could accommodate as much as 38,500 barrels per day. The discrepancy is a reminder of the failed ambitions of the original operator, BP Exploration (Alaska) Inc.

Glacier originally said that it planned to drill the Starfish well this winter using Nabors rig 27E. The project includes a 27-mile ice road connecting the Badami pad to the Endicott road. As of the start of April 2018, the company had yet to receive a drilling permit for the Starfish project from the Alaska Oil and Gas Conservation Commission.

In a plan of development from April 2017, Glacier described Starfish as one of "several new target 'pods' of interest" identified through a recent geologic and geophysical review of the Badami and Killian sands. The prospect is located "to the southwest of the current development area within the Badami Sands" participating area in the middle of the unit.

After his talk at the Alliance, Giesler told Petroleum News that the Starfish well would target an interval immediately above the oil source rock and below the Badami sands.

Sabre

Glacier originally planned to return to exploration with the Sabre well.

continued on page 57

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Hilcorp drills stratigraphic wells at three prospects

Drilling program in the southern Kenai Peninsula in late 2017 mostly supports existing Hilcorp developments in the region

By **ERIC LIDJI**
For Petroleum News

Hilcorp Alaska LLC came to Alaska with a clear focus on development.

The local subsidiary of the Texas-based independent accumulated a large portfolio of legacy assets in the Cook Inlet region and on the North Slope through separate deals with Marathon Oil Corp., Union Oil Company of California and BP Exploration (Alaska) Inc.

Those fields provided more than enough work for Hilcorp, which has long focused on improving production from existing fields through investment and maintenance.

In its first five years in Alaska, Hilcorp only used exploration to expand operations within existing units, particularly at the Ninilchik and Deep Creek units on the Kenai Peninsula.

Even a foray beyond unit boundaries was closely tied to work at nearby units.



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Hilcorp shows no sign of drilling wildcats in Alaska anytime soon. But the company took a somewhat more expansive approach to its exploration activities in the Cook Inlet region in 2017 by drilling 16 stratigraphic test wells at three prospects in the southern Kenai Peninsula — Pearl, Seaview and Deep Creek SW — during

continued on page 56



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the latter half of the year.

Pearl

The Pearl program supports development activities at the Ninilchik unit.

In June 2017, Hilcorp announced plans to build the 3.77-acre Pearl pad to support a one-well delineation program on private lands just beyond the southern boundary of the unit.

By the time the state Division of Oil and Gas approved the pad project in late August 2017, Hilcorp had already received permits from the Alaska Oil and Gas Conservation Commission to drill seven stratigraphic test wells near the proposed pad site: Pearl No. 1A, Pearl No. 2, Pearl No. 3, Pearl No. 4, Pearl No. 5, Pearl No. 6 and Pearl No. 7.

Hilcorp completed the seven stratigraphic test wells between July 11 and Aug. 8, according to AOGCC records. The company drilled all seven wells either on private leases or on state of Alaska or Kenai Peninsula Borough rights of way. All the wells were 600-foot vertical wells except for Pearl No. 3, which was a 540-foot vertical well.

Planning documents from the state suggest that the seven stratigraphic test wells were preparation for the Pearl 2A delineation well from the Pearl pad, scheduled for late 2017.

By the end of March, Hilcorp had yet to receive a drilling permit for Pearl No. 2A.

One objective of the Pearl program, according to the decision from the state, was to determine whether the commercial viability of the Ninilchik unit “extends south of the Paxton Pad and potentially beyond the Susan Dionne-Paxton participating area.”

Union Oil Company of California drilled the 8,000-foot vertical Pearl No. 1 gas well in February and March 2002. The company plugged and abandoned the well in April 2003.

Pearl No. 1 was part of a three-well exploration program associated with Enstar Natural Gas Co. construction plans in the region. The well failed to find commercial quantities of natural gas, leading Enstar to terminate its proposed Kenai-Kachemak Pipeline in Ninilchik, rather than extend it all the way to Anchor Point. It would take another decade before developments in the region finally connected nearby Homer to the regional grid.

In planning Pearl No. 1, Union Oil Company of California described the well as a deviation of an even earlier well, most likely Mobil Oil’s Ninilchik Unit No.1 from 1964.

Seaview

Soon after completing the stratigraphic test well program at Pearl, Hilcorp received permits from the AOGCC to drill seven stratigraphic test wells at the Seaview prospect.

Hilcorp drilled the Seaview No. 1, Seaview No. 2, Seaview No. 3, Seaview No. 4, Seaview No. 5, Seaview No. 6 and Seaview No. 7 wells between Sept. 11 and Sept. 17 in a coastal region south of Anchor Point. The company drilled the wells on private lands, on Kenai Peninsula Borough rights of way and on ADL 392667.

Seaview No. 1, No. 2, No. 4 and No. 5 were 600-foot wells. Seaview No. 3 was a 540-foot well. Seaview No. 6 was a 480-foot well. Seaview No. 7 was a 322-foot well.

Hilcorp owns five leases in the Seaview region with expiration dates between Nov. 30, 2023, and Feb. 28, 2025. The acreage is just onshore from the Cosmopolitan unit.

In early 2018, Hilcorp asked the Alaska Department of Environmental Conservation for permission to amend its Cook Inlet oil discharge, prevention and contingency plan to include a new Seaview pad some 1.2 miles south of Anchor Point in mid-2018.

Deep Creek SW

Following the Seaview program, Hilcorp received permits from the AOGCC to drill two stratigraphic test wells in the vicinity of the Deep Creek unit, between Pearl and Seaview.

The company drilled the 453-foot Deep Creek SW4 test well on Cook Inlet Region Inc. land Oct. 16 and the 401-foot Deep Creek SW3 test well on ADL 389226 on Oct. 17.

According to the state, the company drilled the test wells “to assist in exploring Sterling and Beluga formations.” The program followed the 13,500-foot deviated Greystone No. 1 exploration well that Hilcorp drilled just south of the Deep Creek unit on July 2016.

Going back to the days when Marathon operated the Deep Creek unit, the state has been lobbying for exploration activity in the southern half of the unit. The state has repeatedly threatened to contract those leases out of the unit without signs of forward momentum.

The Greystone program convinced state officials to delay a planned contraction of the Deep Creek unit for the third time, first until May 31, 2016, and then until Nov. 30, 2016.

“Based on the Greystone well results, Hilcorp is narrowing its focus in the Middle Happy Valley area to target Undefined Sterling and Beluga formations,” Division of Oil and Gas Director Chantal Walsh wrote in December 2016, in a decision to defer contraction until June 2017. “Hilcorp now plans to drill six to eight stratigraphic wells to shallow depths in the winter of 2017 in an attempt to better understand the formations’ structure. All the stratigraphic wells will



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continued on page 57

GLACIER *continued from page 54*

Cook Inlet Energy acquired 100 working interest in the nearby Sabre and Sword prospects in 2009 through the bankruptcy proceedings of Pacific Energy Resources Ltd. and through a subsequent farm-in arrangement with Hilcorp Alaska LLC in 2012.

The company brought the Sword No. 1 well into production in November 2013 and was planning to expand its exploration efforts when it turned its attention to Sabre instead.

The Sword and the Sabre prospects continued to appear in plans for the West McArthur River unit over the next few years without ever coming to fruition. In a plan from early 2014, Cook Inlet Energy scheduled the Sabre No. 1 well for April 2016. In a plan from early 2015, the company backed away from firm dates, saying it was evaluating the well.

One complication was the location of the Sabre prospect.

Reaching the target from onshore facilities would require extended reach drilling, which would increase both the cost and difficulty. The company estimated that an extended reach well would cost between \$25 million and \$30 million. By late 2014, the company was "evaluating joint venture offers for participation in the project," to defray the cost.

The target could also be reached vertically using a jack-up rig. But at the time, several other operators had spent years unsuccessfully trying to bring one to Cook Inlet.

Under a plan crafted by Miller Energy in early 2016, Cook Inlet Energy said it was postponing the Sabre well until it had finished developing proven prospects at the unit.

Glacier took over operations soon after and began permitting the Sabre well. By that time, the Cook Inlet region was home to a pair of jack-up rigs and in its application Glacier said it would use the Spartan 151 jack-up rig to drill from an offshore location.

By its next plan of development in early 2017, Glacier said it was "seeking partners in the Sabre prospect to reduce risk factors associated with drilling the Sabre No. 1 well."

The company eventually announced plans to drill the well at the beginning of the 2017 open water season. It later deferred those plans, citing uncertainties about state fiscal policy. The company is currently planning to drill this Sabre well this coming summer. ●

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The West McArthur Unit

HILCORP *continued from page 56*

be drilled to the south of the Happy Valley Participating Area."

In its next plan of development, submitted in March 2017, Hilcorp announced plans to drill six stratigraphic test wells in the vicinity of the Deep Creek unit. The company said it would complete the first four wells before June 2017. The remaining two, which required the public winter trail system, were scheduled for the late third quarter of 2018.

The results of the program, according to Hilcorp, would help guide exploration drilling plans targeting the Sterling and Beluga formations at Deep Creek in 2018 and 2019.

The state approved the plan, which also included a new request for delayed contraction. ●

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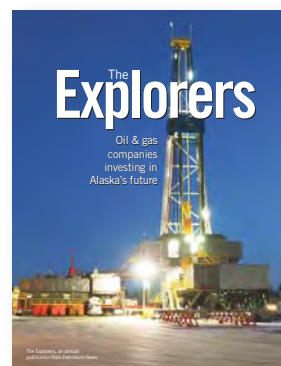
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Advertiser Index

A	G-M
AES Electric Supply Inc.54	Glacier Oil & Gas50
Afognak Leasing LLC8, 52	GMW Fire Protection38
Ahtna Inc.42	Greer Tank & Welding5
AIDEA16	ICE Services Inc.37
Alaska Communications56	Judy Patrick Photography43
Alaska Dreams28	Little Red Services Inc. (LRS)11
Alaska Frontier Constructors4	Lounsbury & Assoc. Inc.45
Alaska Gasline Development Corp. ..9	Lynden60
Alaska Materials41	MAPTS (Mining & Petroleum Training Svc)50
Alaska Resource Education6	Matheson Tri-Gas Inc.22
Alaska Steel27	N-P
All American Oilfield LLC26	Nalco Champion14
American Marine/PENCO3	NANA Development Corp.23
Arctic Catering & Support Services.21	NANA WorleyParsons40
Arctic Controls11	Nature Conservancy51
Arctic Slope Community Foundation35	Nordic-Calista Services47
Arctic Slope Telephone Assoc. Co-op (ASTAC)12	North Slope Telecom47
Armstrong Energy LLC14	Northern Solutions LLC38
B-F	NRC Alaska29
Calista Corp.10	Pathfinder Aviation 18, 34, 36, 55
Carlile Transportation59	Petro Star Lubricants/North Pacific Fuel42
Chosen Construction55	PRA (Petrotechnical Resources Alaska)19
Chugach Alaska Services17	Price-Gregory International46
City of Kenai Ind. Park & Airport33	Product Testing Services (PTS)3
Coffman Engineers Inc.57	Q-Z
Colville7	RDC48
CONAM Construction39	South Nanushuk Prospect/Trading Bay20
Cruz Companies2	Tanks-A-Lot27
Delta Western Fuels54	Udelhoven Oilfield System Services Inc.29
Doyon Ltd.6	Waste Management National Services15
exp Energy Services34	Waters Petroleum36
ExxonMobil25	Wesco Distribution Inc.35
F.R. Bell & Assoc. Inc.24	
Five Star Oilfield Services49	
Flowline Alaska44	
Fluor58	
Foss Maritime13	

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