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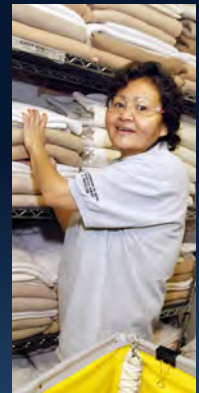


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Released June 9, 2024

THE EXPLORERS is a special annual supplement to Petroleum News, which is owned by Petroleum Newspapers of Alaska LLC.

MAILING ADDRESS:

PO Box 231647

Anchorage, AK 99523-1647

Phone: (907) 522-9469

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circulation@PetroleumNews.com

Web page:

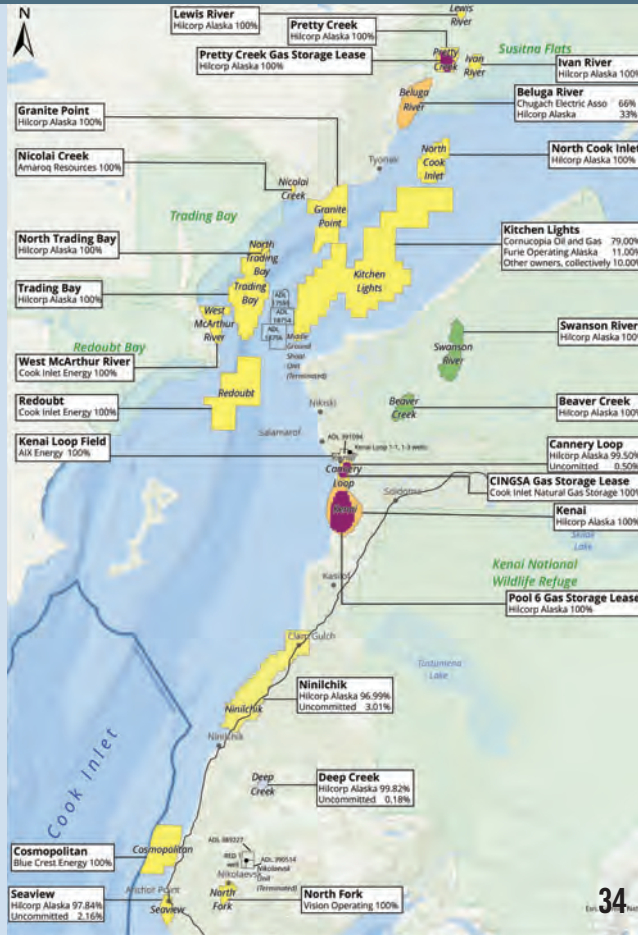
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On the cover: Rig at Voodoo #1 Well, Lagniappe Project, North Slope Alaska, Armstrong Oil & Gas, Inc.

Photo by Judy Patrick, courtesy of Armstrong

Printed by Century Publishing, Post Falls, Idaho



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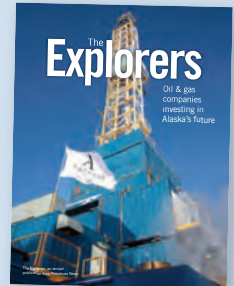
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Welcome to The Explorers 2024

Armstrong exploration drilling extends Brookian topset fairway 65 miles east

Kudos to the explorers featured in this year's issue of The Explorers magazine: 88 Energy, Armstrong's Lagniappe, ASRC Energy, 88 Energy, ConocoPhillips, Great Bear Pantheon, Hilcorp, Jade Energy and Savant Glacier.

In 2013, Armstrong Oil & Gas Inc. and its partner Repsol kicked off the prolific Brookian topset play with the multi-billion-barrel oil discovery in the Pikka field west of the central North Slope, the largest component being the Nanushuk reservoir.

Large lookalike new field discoveries have since been made at Willow, Stirrup, Mitquq and Coyote. These fields are currently in the early stages of development, and in aggregate, have projected resources in excess of 5 billion barrels.

With Armstrong's understanding of these new discoveries, the company identified multiple lookalike prospects 70-90 miles east on the eastern North Slope. Lagniappe, an Armstrong affiliate (holding a 25% working interest ownership), drilled three of these prospects during the 2024 winter exploration season as operator on behalf of partners APA Alaska LLC (50% WIO), an APA Corp. affiliate company and Oil Search (Alaska) LLC (25% WIO), a Santos affiliate company.

The three wells (King Street #1, Voodoo #1, Sockeye #1) each targeted large 3D-defined opportunities.

The King Street #1 well was drilled to a total depth of 10,241 feet. Hydrocarbons were found in two separate hydrocarbon zones

at depths of 8,130 feet and 9,850 feet. Wireline evaluation, sidewall cores and MDT data from the well indicate pay in both lower and upper zones in high-quality late Cretaceous clastic reservoirs.

Further evaluation will be undertaken to determine the scope and focus of future appraisal drilling necessary to determine the size and extent of these discoveries, Armstrong said.

The Sockeye #1 well and the Voodoo #1 well were unable to reach their targeted depths due to a number of operational and weather-related challenges. Both wells were plugged before reaching the targeted formations.

"Wildcatting is a challenging endeavor. The wells we drilled this year were located 70-90 miles east of older Brookian topset discoveries. Only two wells had ever been drilled on our 275,000-acre land position (one well/215 square miles)," said Bill Armstrong, president of Armstrong Oil & Gas.

"Despite the lack of well control, our regional geologic studies indicated evidence for connectivity to a working petroleum system, and our objectives have potential for very favorable (porous and permeable) rock properties," he said.

Petroleum News sources say: Armstrong might be onto something big. ●



KAY CASHMAN
Petroleum News
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Explorers keep pursuing exploration licenses

Program continues to make acreage available outside major producing basins

By **ERIC LIDJI**
For *Petroleum News*

Alaska has many small prospects that would be instantly sanctioned almost anywhere else in the country but are not large enough to overcome the logistical challenges inherent to the far north: getting supplies to the site and moving production back to market.

While some of those burdens have been gradually overcome in large basins thanks to decades of step-out development, no one has yet cracked the code for the rest of the state.

And yet, explorers keep trying.

The exploration licensing program offered by the state Division of Oil and Gas is a way for companies to venture beyond the regions covered by existing lease sales. In the decades since the exploration license program was launched, it has led to many issued licenses, a small number of exploration activities, and no commercial production to date.

The state Division of Oil and Gas can make a preliminary determination that certain areas are suitable for exploration licensing and then begin accepting proposals for exploration.

Each April, companies can request a license for a geographic area

between 10,000 and 500,000 acres, along with a proposed financial work commitment and a term limit. Other companies can then make competing bids, in an effort to get the best deal for the state.

There are currently two active “determined” areas.

The “Southcentral Region” is an L-shaped area including the coastline along Prince William Sound and extending north to include the southern edge of the Interior, including the cities of Cordova, Valdez, McCarthy, Glennallen, Talkeetna, Paxson and Tok.

The “Nenana Region” covers a smaller area immediately west of the Fairbanks North Star Borough and immediately west and north of the Interior city of Nenana.

There is currently one active exploration license and one license under appeal.

Houston-Willow

Samuel Cade and Daniel Donkel currently hold a six-year exploration license covering 18,698 acres in the Houston-Willow basin with a \$500,000 work commitment. The state awarded the license on Dec. 1, 2018, and therefore expiration is pending this December.

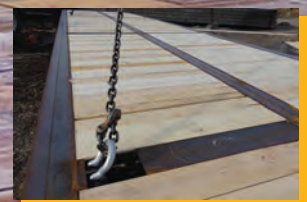
The partners originally submitted the application in April 2007

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Western North Slope, Alaska

1957
Richfield Oil Co. drills the first well in the Swanson River field and strikes oil.

1959
Alaska becomes the 49th state.

1968
ARCO discovers oil in the Prudhoe Bay field.

1969
Sinclair Oil Co. discovers the Kuparuk River field.

2000
Alpine field production begins from wells drilled with horizontal well technology.

2023
Final Investment Decision is made to develop the Willow project.

Learn more

1957

1959

1968

1969

2000

2023



LICENSES *continued from page 10*

with local independent LAPP Resources Inc. but resubmitted after the death of principle Dave Lappi in 2011.

According to the Division of Oil and Gas, some 22 earlier penetrations have been drilled in the Houston-Willow basin, mostly to evaluate shallow gas and coalbed methane.

Exploration began around 1917, when excavations for the Alaska Railroad exposed subbituminous coal. The coal supplied area military bases until at least 1955. The U.S. Bureau of Mines drilled three core holes in 1951-52, with reports of methane and brackish water. Anchorage Oil and Gas completed a sidetrack of one of these core holes in 1955, but no information exists about the results. Anchorage Gas and Oil Development and Hackathorn Drilling separately completed five wells between 1956 and 1962.

After a period of dormancy, Growth Resource International and Evergreen Resources completed six coalbed methane wells in the Houston area between 1998 and 2004.

The state approved the exploration license with the hope that modern exploration techniques "would likely help to resolve details of the anticline's geometry and to clarify its conventional gas and CBM resource potential," according to the decision results.

Gulf of Alaska

A second proposed exploration license in the Katalla region of the Gulf of Alaska has been under appeal for several years by applicant Nikiski-based Cassandra Energy Corp.

The Division of Oil and Gas initially leaned toward granting the company a 10-year license over 65,773 acres with a \$1 million work commitment but ultimately denied the application in late 2020, saying it failed to serve the best interests of the state.

The state said the denial reflected the particulars of the project — its technical complexities relative to the current geologic prospects —

not a disinterest in seeing activity in the basin. In short, "the potential positive effects of the exploration license do not clearly outweigh or balance the potential negative effects to the other resources and habitat of the license area," then-Division of Oil and Gas Director Tom Stokes wrote.

A British consortium drilled near Katalla Meadows in 1902 to investigate oil seeps from the mid-1890s. The consortium sold some of its assets in 1910 to Amalgamated Development Corp. out of Washington state, which sold them to Chilkat Oil Co. in 1911.

Chilkat Oil built a small refinery. Kennecott Copper Corp. acquired the properties in 1922, a few years after additional drilling in the area led to a small boost in production. The area was seen as promising but hampered by its remoteness. The refinery burned down in 1933 and was never rebuilt. All told, some 154,000 barrels of oil were produced.

Northern Development Co. visited in the 1950s, using a provision of federal law giving the Interior Department permission to grant contracts in frontier basins. Other companies explored through the early 1960s, all without success. Chugach Alaska Corp. secured an exclusive exploration contract from the early 1980s through the early 2000s.

Cassandra Energy President William H. Stevens joined that venture in the early 2000s, but his project was thwarted by a combination of environmental and regulatory delays until the late 2010s, when he submitted his exploration license application to the state.

Susitna Valley

The 2023 issue of *The Explorers* included a profile of Alaska Natural Gas Corp., which had two applications pending for a single exploration program in the Susitna Valley. The applications have since been removed from the state's exploration licensing page.

The two license areas covered 913,249 contiguous acres in the Susitna River basin within the Matanuska-Susitna valleys, immediately west of the Parks Highway.

Alaska Natural Gas Corp. submitted its proposal in late April 2017, asking for 10-year licenses, each with a \$500,000 work commitment. Based on economic and geologic considerations, the state imposed \$3 million and \$3.3 million work commitments. The licenses only allow for natural gas exploration. The Susitna Valley is considered gas-prone, with a higher likelihood of unconventional resources such as coal-bed methane.

Alaska Natural Gas Corp. is a privately held company. On its website, the company said it plans to use horizontal drilling technology to target coal-bed methane in the region. ●

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88 Energy announces light oil at Hickory well

Flow test confirms oil discovery at Project Phoenix, testing will continue

By **ERIC LIDJI**
For *Petroleum News*

In an announcement on April 2, 2024, as The Explorers was going to print, 88 Energy Ltd. announced that flow testing of the Upper SFS reservoir had confirmed a light oil discovery at the Hickory No. 1 well “in line with expectations.” Production during the flow test peaked above 70 barrels per day of approximately 40-degree API oil gravity.

Through its subsidiary Accumulate Energy Alaska Inc., 88 Energy perforated a 20-foot section of the Upper SFS reservoir at Hickory No. 1 and conducted a single fracture.

The well flowed for 111 hours — 88 naturally and the rest with nitrogen lift. The well flowed at an average rate of 42 barrels per day and a total range between 10 and 77 barrels per day with a maximum of 15% oil cut by the end of the flow test. The flow included unmeasured quantities of natural gas liquids as well as associated gas.

88 Energy CEO and Managing Director Ashley Gilbert said in a statement, “Outcomes from this test represent a significant milestone for 88 Energy and its shareholders, with the first successful flow of oil to surface achieved at the company’s Alaska projects.

“The completion of flow testing in this zone and recovery to surface of light oil, in addition to (natural gas liquids) and associated gas, confirms our understanding of the substantial potential of these reservoirs. Significantly, these flow rates were achieved from only a 20-foot perforated section in a vertical well with a low volume stimulation over a short period. As previously highlighted, production rates in long horizontal production wells are typically multiples of six to 12 times higher than tested in vertical wells, as evidenced in many Lower 48 analogues.

“Importantly, the Upper SFS zone had not previously been intersected or tested at either Project Phoenix or on adjacent acreage. It is particularly exciting for us to produce oil to surface and demonstrate the producibility of this additionally discovered reservoir. Future plans for the assessment of the commerciality of Project Phoenix will be communicated post analysis of the Hickory-1 program.

“We will now proceed to undertake flow testing of the shallower SMD-B reservoir over the coming weeks. This is a zone which has previously been successfully tested on adjacent acreage to the north.”

The next phase of the flow test will focus on the SMD-B reservoir.

The flow test is part of 88 Energy’s Project Phoenix.

The company drilled Hickory No. 1 in early 2023 using Nordic



ERIK OPSTAD



ASHLEY GILBERT

BREAKING NEWS

Second light oil discovery

In an April 15 ASX announcement 88 Energy Limited reported dual reservoir success at the company’s Hickory-1 well with a second light oil discovery at the SMD-B reservoir.

The SMD-B had a peak flow rate of ~50 barrels per day of light oil measuring approximately 39 degree API oil gravity, under nitrogen lift. The reservoir showed little to no measurable associated gas flow.



NAME OF PARENT COMPANY:

88 Energy Ltd.

NAME OF ALASKA COMPANY:

88 Energy Alaska Inc.

ALASKA OPERATING SUBSIDIARIES:

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TOP EXECUTIVE: Ashley Gilbert, managing director

ALASKA MANAGER: Erik Opstad (Oversees Accumulate, Captivate & Emerald House)

COMPANY WEBSITE: www.88energy.com

Calista Rig No. 2 and secured All American Oilfield Rig-111 for the flow test. The project was financed, in part, through funding committed from junior partner Burgundy Xploration, LLC.

Icewine

Under the name Tangiers Petroleum Ltd., 88 Energy originally pursued oil and natural gas prospects offshore Morocco and both onshore and offshore Australia. Following a pivot, 88 Energy Ltd. came to Alaska in late 2014 to pursue North Slope opportunities.

The company arrived in Alaska in late 2014 through an agreement with Burgundy Xploration to acquire 87,000 acres in the central North Slope south of Prudhoe Bay.

88 Energy initially saw Icewine as an unconventional play but later pursued conventional opportunities as a way to generate cash flow to fund a wider range of projects.

Project Phoenix was originally an unconventional HRZ play called Icewine East. The company renamed the play in 2022 to

reflect a new strategy: focusing on proven oil-bearing conventional reservoirs identified during by previous drilling activities.

The Icewine prospect always included eastern and western blocks. The company drilled the Icewine No. 1 well in 2015 and the Icewine No. 2 well in 2017 on the eastern block, and it drilled the Charlie No. 1 conventional well in 2020 on the western block.

88 Energy drilled Hickory No. 1 to test four reservoirs: the Shelf Margin Delta, Slope Fan System, Basin Floor Fan and Kugaruk. The Shelf Margin Delta (SMD-C, B and A) was the primary target. The Slope Fan System and Basin Floor Fan reservoirs were secondary targets. The deeper Kugaruk reservoir was a tertiary target. The company has said it is targeting "647 million barrels of oil unrisks net mean prospective resources."

The project is a joint venture with Burgundy Xploration. Through subsidiary Accumulate Energy, 88 Energy holds 75.2% percent working interest in some 184,000 net acres.

Project Phoenix is south of Pantheon Resources acreage, and 88 Energy has been touting similarities between the projects. Pantheon recently discovered resources in the Lower Basin Floor Fan reservoir. "The Basin Floor Fan reservoir was the deepest of the multiple hydrocarbon-bearing pay zones intersected as part of the Hickory-1 exploration well. This reservoir, along with our primary, high-priority SMD, Upper SFS and SFS targets, is planned to be flow tested as part of the upcoming program," Gilbert said in September 2023.

Charlie No. 1 in Icewine West "confirmed large condensate discovery in the Torok formation in both Middle Stellar and Lower Stellar targets," according to 88 Energy. The company is considering a future flow test, pending the results of the Hickory project.

A recent mapping initiative at Icewine West identified a series of Mid Schrader Bluff prospects. Building on its enthusiasm for Hickory No. 1, as well as its interpretation of Pantheon Resources' certified contingent resources at the nearby Kodiak prospect, 88 Energy is evaluating the Schrader Bluff prospects as part of its Icewine West portfolio.

Leonis

88 Energy is also working to advance its Project Leonis this year.

Through its subsidiary Captivate Energy, the company is preparing a "prospective resource estimate ahead of targeted farm-out next year and potential drilling of a new well early in the 2025/26 winter season," according to an October 2023 statement.

In a November 2022 lease sale, Captivate Energy acquired 10 state leases covering some 25,600 acres south of the Prudhoe Bay unit, adjacent to the Trans-Alaska Pipeline System and the Dalton Highway. The acreage had previously been included in the Storms 3D seismic data from 2005 and contains ARCO's Hemi Springs Unit



Drilling at Hickory No. 1 in March 2023

No. 3 exploration well from 1985 and Pioneer Natural Resources' Hailstorm No. 1 well from early 2006.

88 Energy is interested in an Upper Schrader Bluff reservoir that is productive in the West Sak and Polaris fields to the northwest but was not a zone of interest for ARCO.

Hemi Springs Unit No. 3 well files indicated more than 200 feet of logged net pay in the Upper Schrader Bluff reservoir, with good porosity and oil shows evident over the interval. An initial internal interpolation of the Storm 3D data indicated an Upper Schrader Bluff prospect bound by faults on three sides, according to 88 Energy.

continued on next page


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Yukon

Although currently low on its list of priorities, 88 Energy continues to hold a lease position on the eastern North Slope through its subsidiary Regenerate Alaska LLC.

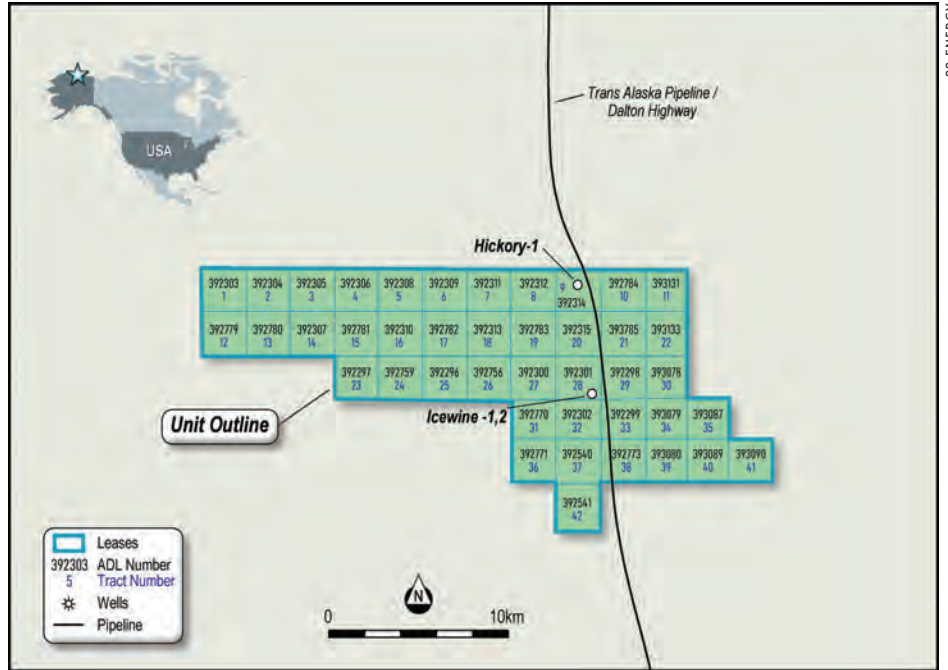
The company began acquiring acreage near the border of Area 1002 of the Arctic National Wildlife Refuge in 2017 and 2018. The company asked federal regulators to cancel those leases after the Biden administration suspended ANWR activity in 2021.

Even after surrendering the leases, 88 Energy holds some 38,681 acres in the area through its subsidiary Regenerate Alaska. The leases include BP’s Yukon Gold No. 1 discovery from the early 1990s. 88 Energy acquired 3D seismic over the acreage in 2018.

88 Energy estimates that the acreage contains some 90 million barrels of prospective resource and believes there is an opportunity to utilize new Point Thomson infrastructure.

Peregrine

After several years of work at Icwine, and acquiring leases at Project Yukon, 88



Energy shifted to Project Peregrine, drilling two wells at the Merlin prospect in 2021 and 2022.

Through its subsidiary Emerald House LLC, 88 Energy is looking to farm out exploration activities that could prove up several newly identified prospects at its Project

Peregrine, located in the southeastern part of the National Petroleum Reserve-Alaska.

In October 2023, 88 Energy released an independent prospective resource update for Project Peregrine identifying two new prospects in the Nanushuk — N12 and N13.

According to the company, a short sidetrack of the proposed Harrier No. 1 well could now assess as many as three independent prospects from a single ice pad. The company said it was undergoing “multiple ongoing discussions with near-field operators regarding potential cost-sharing arrangements for Project Peregrine over the coming years.”

The U.S. Bureau of Land Management approved a 12-month suspension of the Project Peregrine leases in December 2023, running through Nov. 30, 2024. The suspension relieves the company of conducting activities on the leases aside from basic maintenance activities and also relieves the company of lease rentals due in the first quarter 2024.

Without the pressures of drilling commitments and lease payments, the company can focus on the preliminary activities underpinning future exploration work at the site, including “the refinement of internal geological and geophysical models/interpretation, including further optimization of the Harrier No. 1 location,” according to the company.

Project Peregrine covers 195,373 net acres in the NPR-A north of the Umiat prospect and a south of the Willow prospect. 88 Energy is the sole working interest owner.

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Project Peregrine includes three prospects: Merlin and Harrier in the Nanushuk formation around 5,000 feet and Harrier Deep in the Torok/Basin Floor Fan around 10,000 feet.

Emerald House drilled the 5,267-foot Merlin No. 1 well in early 2021 using All-American Rig 111, which was deconstructed and transported over existing snow trails. The well encountered oil targets of the N20 and N18 intervals of the Nanushuk, according to 88 Energy. It also noted a “hydrocarbon signature” in the N19 interval.

The Merlin No. 1 results also suggested the potential of a proposed 6,000-foot Merlin 1A sidetrack targeting the N14 interval. The company has yet to sanction Merlin No. 1A.

The proposed Harrier No. 1 well would provide further information about those deeper targets by pursuing the N15 and N14 North intervals to the north of the Merlin wells.

Encouraged by the results, Emerald House drilled the 7,334-foot Merlin No. 2 appraisal well east and down-dip from Merlin No. 1 using the Arctic Fox rig in 2022. It targeted an estimated 652 million barrels of oil in three Nanushuk zones — N18, N19 and N20.

The tightness of the formation prevented 88 Energy from logging samples from all three targeted zones, and the company ultimately plugged and abandoned the well.

Umiat

88 Energy acquired the Merlin prospect amid the upheavals of the coronavirus pandemic in mid-2020 through an off-market takeover of XCD Energy, secured a farm-out partner toward the end of the year, and acquired the neighboring Umiat prospect in early 2021.

The Umiat oil field is immediately south of Project Peregrine.

Given the remoteness of the area, any development of one would certainly improve the economics of the other.

Umiat is one of the largest undeveloped oil fields in Alaska. The U.S. Navy discovered the field in 1946, during a post-war campaign to increase domestic oil supplies.

While the majors were focusing on massive central North Slope oil fields, independents Arctic Falcon Exploration, Renaissance Alaska, and Rutter and Wilbanks pursued Umiat in the late 1990s and early 2000s, but none advanced the project beyond exploration.

The remoteness of the Umiat leases and the technical complications of the geology have forced many companies to scale back or abandon ambitious exploration efforts.

Australian independent Linc Energy Ltd. drilled the vertical Umiat No. 18 well, collected 300 feet of core and encountered 100 feet of net pay in the Lower Grandstand in early 2013. Using chilled drilling mud to prevent permafrost from thawing in the shallow reservoir, and employing an open-hole completion design, the company drilled the 4,100-foot Umiat No. 23H well in early 2014. It was the first horizontal well ever drilled at the Umiat oil field and the first successful flow test at the field in decades.

An ambitious development program for Umiat was thwarted by a decline in oil prices, leading Linc to file for bankruptcy protection in 2016 and sell its Alaska assets.

Arctic Acquisition Inc. grabbed Umiat with an \$80 million credit bid and turned over operatorship to Malamute Energy Inc. Malamute Energy spent several years de-risking the property before selling it to the 88 Energy subsidiary Emerald House in 2021. ●

Contact Eric Lidji at ericlidji@mac.com



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King Street #1 Well Pad and Ice Road, Lagniappe Project, North Slope Alaska, Armstrong Oil & Gas, Inc.

Bill Armstrong brings in Apache

Lagniappe-operated endeavor on E. North Slope risky but high reward

By **KAY CASHMAN**
Petroleum News

Since the last annual issue of The Explorers magazine was released in June 2023, Bill Armstrong has brought APA Corp., holding company for Apache Corp., into the 275,000-acre block of 148 leases that he put together south and southwest of the Badami unit on the eastern North Slope; acreage he operates through Armstrong Oil & Gas subsidiary Lagniappe Alaska. Santos was already a partner in the leases.

The deal he cut made APA a 50% working interest owner, with Lagniappe and Santos each holding 25%.

APA said it planned to invest \$1.9 billion to \$2.0 billion in upstream oil and gas capital worldwide in 2024, investing for the long term by directing \$100 million of the upstream budget toward exploration activities predominantly in Alaska.

Lagniappe is a Cajun word that loosely translates into “a little something extra” or “a good unexpected surprise” — apropos for the Nanushuk play on the North Slope, which Armstrong and a partner first drilled and identified as a huge oil reservoir in 2013 (Qugruk 3 well). The discovery led to the 100 billion-barrel Pikka oil field, today operated and being developed by Santos.



BILL ARMSTRONG

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Since that billion-barrel discovery, the oil industry has been on a tear, drilling at Pikka, Horseshoe, Putu, Mitquq, Stirrup, Willow, West Willow, Harpoon and Bear.

All reports say the play concept in Lagniappe’s acreage to the east is very similar: Multiple zones, onshore, good gravity oil, reasonably close to infrastructure.

But the targeted objectives are slightly younger than what Santos and partner Repsol have at Pikka et al but with better reservoir qualities — porosity and permeability — even though they are somewhat deeper.

There have been very few wells drilled in and near Lagniappe’s South Badami area — and most of those wells were drilled in the

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1970s trying to find another Prudhoe Bay, but almost all of the wells had good oil shows, Armstrong said.

Prior to finding all of that oil in the Nanushuk formation west of Prudhoe Bay and the central North Slope most people were saying Alaska's North Slope had very little remaining potential. The Nanushuk at Pikka changed all that.

Armstrong thinks there are new oil discoveries to be made east of Prudhoe Bay, also in the Brookian.

In a text to Petroleum News before the partnership deal was struck between APA, Santos and Lagniappe, Armstrong described the area as "defined off of high effort, reprocessed modern 3D. Really exciting stuff. Big targets," adding there has been "virtually no prior drilling in the area. The wells that have been drilled have great shows and some have bypassed pay on old logs."

Gallagher, Christmann happy

On Sept. 19, 2023, Santos Managing Director and CEO Kevin Gallagher said he was "pleased we've reached this agreement to farm down our exploration assets in Alaska. This transaction demonstrates the continued level of interest in exploration and development projects in the region, a tier one jurisdiction with supportive stakeholders and prospective undeveloped acreage," he said, noting it was consistent with Santos' decision to concentrate on the development of Pikka Phase 1 west of the central North Slope.

In a conference call on Feb. 22 that covered fourth quarter and full year 2023 financial and operational results, APA CEO and President John J. Christmann was asked to provide more color on the risk profile for the eastern North Slope exploration drilling program.

"These are 3D and amplitude supported but this is a step-out in an area where there is risk associated with it so I'm not going to give you a number on a ratio. We're going to drill three wells and they are risky but they're high reward," Christmann replied.



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Christmann asked Tracy Henderson, the company's exploration manager, to expand on his response and she said: "What interested us in the block was that we do see materiality with these prospects that warranted exploration."

He also turned to her when asked whether the partners were searching for Pikka lookalikes. "Yes, I would agree with that," Henderson said. "We're looking at more play types like Pikka and Willow on the other side of Prudhoe Bay. And that is the Brookian play we're going to be exploring for in a younger sequence but it's absolutely the same geologic model and set up that we expect to see. Basically just farther east than it's been explored for."

Unexpected challenges

Drilling was to begin in February 2024, using three drilling rigs to simultaneously drill three exploration wells.

In a Feb. 26 text Bill Armstrong updated Petroleum News on Lagniappe's progress.

"Our drilling is just now starting," Armstrong wrote.

"Warm weather, then really windy weather has delayed our program a couple of weeks."

More unusually bad weather followed and continued to plague drilling operations — more wind, snow and below normal temps.

What impact these conditions have had on drilling and possible flow-testing operations is unknown, but PN sources say all three wells will be completed this season.

Likely in response to rumors APA's Apache would take over operatorship if Lagniappe's drilling program was successful, Christmann was asked on Feb. 22 "what's next in the timeline for the program?"

"We're in the exploration stage right now, so we've done a lot of scoping. It's onshore on state lands. Things can move a little quicker than on federal there. You're close to big pipeline capacity, but let's work through the exploration phase, see what we find and then go from there at a later date. But we're excited about it," Christmann replied.

Apache April 8 update

When asked for an update on the eastern North Slope drilling program, Alex Franceschi, a spokesperson for APA's Apache Corp., sent Petroleum News the following statement on April 8: "The three rig drilling operation is ongoing and we have no results to report at this time. We plan to provide an update after we finish the drilling program and analyze the technical data."

In September 2023 Franceschi was asked by Petroleum News how Apache got involved in the deal. "Apache maintains a global exploration team for the purpose of generating attractive future growth opportunities. As previously disclosed, we strategically allocate a limited percentage of our capital program each year to exploration activities, and this partnership in Alaska is a part of that program," she replied.

The partners are looking at drilling three more wells next winter, so a total of six wells with three rigs drilling simultaneously in both cases.

Under the terms of the deal between the three working interest owners, initial exploration activities during the two-year exploration phase will be undertaken without cost to Santos, which is concentrating on development of Pikka Phase 1 west of the central North Slope.

Armstrong's agreement with APA has not been disclosed. ●

Contact Kay Cashman
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A global first at the top of the globe

ASRC Energy launches first long-term test of methane hydrates production

By **ERIC LIDJI**
For *Petroleum News*

As this issue of *The Explorers* was going to print, ASRC Energy Services was about six months into long-term test of a North Slope methane hydrates well — a global first.

The subsidiary of the Alaska Native corporation for the North Slope began the test in late October 2023 on state lease ADL 47450 in the western end of the Prudhoe Bay unit, working on behalf of a consortium including both American and Japanese entities.

ASRC Energy completed three wells on the lease in late 2022 and early 2023 — Hydrate O2, Hydrate P1, and Hydrate P2 — from the Kuparuk State 7-11-12 pad at Prudhoe Bay, some 20 miles northwest of Deadhorse. The company had previously completed the Hydrate O1 well in late 2018 and early 2019, but the project was delayed the following spring with the arrival of first restrictions associated with the coronavirus pandemic.

The drilling and testing program is being called the International Hydrates Testing Project, an acknowledgment of the global partnership behind the undertaking. ASRC Energy Services Alaska Inc. is under contract with the National Energy Technology Laboratory of the United States Department of Energy as well as the Japan Oil, Gas and Metals National Corp. to conduct methane hydrate research at the site.

A separate contract with Prudhoe Bay operator Hilcorp North Slope LLC allowed ASRC Energy to drill and complete the three recent wells at the unit to produce methane from gas hydrate zones for specific purposes, to collect data and to install surface facilities. It also required ASRC Energy to remove its infrastructure at the end of the project.

The earlier well came during the operatorship of BP Exploration (Alaska) Inc.

The Hilcorp contract prohibited ASRC Energy from drilling “to any depth or location that may encounter or otherwise interfere with or impact any interval producing oil or gas within the (Prudhoe Bay unit) by the (Prudhoe Bay unit) working interest owners.”

According to previous project descriptions, one well would be produced through a series of depressurization tests. As much as 1.7 million standard cubic feet per day of gas would be produced during the test, about the size of a mid-range Cook Inlet natural gas field.

Any production will be used at the facility, with additional supplies coming from an unnamed North Slope producer, according to the state. “In emergency conditions, excess produced gas will be flared. In no circumstances will produced gas be shipped off site.”

According to a timeline included in state filings, the production test would last around seven months. If correct, the test would be completed some time in May or June 2024.

History

In the never-ending effort to pull more hydrocarbons out of



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The current test is the first time development theories are being tested over long periods of time, crucial for understanding how the resource responds to changes in field pressure.

the North Slope, methane hydrates have captured the imagination of geologists and drillers in the 21st century.

Once considered a nuisance, they are now seen as a huge resource. Free the methane from its hydrate “cage,” and it contains some 160-180 times its volume in free gas.

There have been numerous methane hydrate research projects around the world over the past 25 years. Alaska has been a global center for much of this research thanks to the prevalence of the resource within close proximity to existing development infrastructure.

While those efforts have yielded much valuable data, they were all relatively short. The current test is the first time development theories are being tested over long periods of time, crucial for understanding how the resource responds to changes in field pressure.

In a conventional reservoir, underground pressure pushes

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hydrocarbons to the surface through a wellbore. As this pressure declines over time, it must be boosted artificially.

With methane hydrates, relatively high pressures and low temperatures actually impact the structure of the resource, and therefore production can alter the nature of the resource. If that process can be better understood and controlled, the hydrates can be unlocked.

Some believe this process is already underway at the East Barrow gas field, which has surpassed original estimates for gas in place without major declines in reservoir pressure.

A preliminary study of the field in the early 2000s suggested that the reservoir might exist at least partially within the stability zone required for producing hydrates. (An alternate theory credits the extended production to water flowing into the reservoir and bolstering production, but low water production at the field might suggest otherwise.)

Resource size

The reward for cracking the code is huge. According to the Office of Fossil Energy, "Gas hydrate deposits are found wherever methane occurs in the presence of water under elevated pressures and at relatively low temperatures, such as beneath permafrost or in shallow sediments along deepwater continental margins. Once assumed to be rare, gas hydrates are now thought to occur in vast volumes and to include 250,000-700,000 trillion cubic feet of methane and the formation thickness can be several hundred meters thick."

One cubic meter of hydrates can release 164 cubic meters of natural gas. And according to the U.S. Geological Survey, the

One cubic meter of hydrates can release 164 cubic meters of natural gas. And according to the U.S. Geological Survey, the North Slope could hold some 53.8 trillion cubic feet of natural gas contained within hydrates — relative to Prudhoe Bay or Point Thomson in size.

North Slope could hold some 53.8 trillion cubic feet of natural gas contained within hydrates — relative to Prudhoe Bay or Point Thomson in size.

Alongside the work at Barrow in the mid-2000s, the U.S. Department of Energy convened a public-private coalition to further study methane hydrates on the North Slope.

Working with BP Exploration (Alaska), ASRC Energy Services, Ryder Scott Co., the U.S. Geological Survey, the University of Alaska Fairbanks and the University of Arizona, the DOE completed preliminary geologic and economic modeling in 2004.

BP Exploration planned to drill a stratigraphic test well at the Mount Elbert prospect at the Milne Point unit in early 2007. The team used seismic data to make predictions about the prospect and then drilled to get some confirmation of those predictions. "As it turned out our predictions were very correct," the DOE's methane hydrates technology manager Ray Boswell said at the time. The Mount Elbert well confirmed hydrates in two zones.

The project also involved some technical milestones. It developed a new technique for recovering core samples before the methane disassociated from the surrounding water. It also included the first open-hole extended duration pressure test of a gas hydrate reservoir, allowing the team to verify some of the conclusions of its prior modeling.

After a period of extended analysis, the DOE and BP Exploration announced plans in early 2009 to conduct a long-term gas hydrates production test for data collection.

Around that time, the DOE joined a third North Slope methane hydrates project led by ConocoPhillips Alaska to develop methane hydrates using carbon dioxide injections.

ConocoPhillips spud the Ignik Sikumi No. 1 well in early 2011 from a site adjacent to L-pad at the Prudhoe Bay unit. The Japan Oil, Gas and Metals National Corp. joined the project the following winter, during the injection and production phase of the project.

A collection of technical papers about the program can be found online at <https://pubs.acs.org/doi/full/10.1021/acs.energyfuels.2c02106?ref=EFHydratesAlaska> ●

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ConocoPhillips turning to Titan this year

Bear No. 1 well from 2023 was dry hole; company stays close to home this year

By **ERIC LIDJI**
For Petroleum News



EREC ISAACSON

Even though the slowest days of the pandemic appear to be past, ConocoPhillips has yet to fully regain the enthusiasm for exploration it consistently demonstrated before 2020.

Since the late 1990s, the global upstream company has been the standard bearer of North Slope exploration, steadily advancing infrastructure west over a quarter century. This winter, the company seems to be focusing its exploration energy on the Fiord West Kuparuk participating area in the northwest corner of the Colville River unit.

The main project in that area is Titan No. 1. The pilot well would “evaluate subsurface data to support continued oil and gas development,” according to the company.

The proposed Fiord West Kuparuk Titan 1 pilot well would be located some 5 miles north of the CD5 pad but makes use of its infrastructure. The proposed well is located in the northwest corner of

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the Colville River unit and would require some 9 miles of new ice roads extending from the existing gravel road connecting CD5 to the larger road grid.

Along the ice road, ConocoPhillips would build two 500-foot by 500-foot ice support pads for equipment and personnel, and a 700-foot by 700-foot ice drilling-pad on Kuukpik Corp. land on Section 17 of Township 12 North-Range 4 East. The road includes spurs to nearby lakes.


Iapetus, Char




The current program builds upon exploration work undertaken by ConocoPhillips and its predecessors more than 15 years ago, before new infrastructure eased access to the area.

ConocoPhillips predecessor ARCO Alaska Inc. conducted the Fiord West 3D survey nearby in 2000. The Alpine oil field at the Colville River unit came online later that year.

ConocoPhillips requested expansions of the unit boundaries in 2002 and 2004. The 2004 expansion added 17,149 acres at the northwest corner of the unit, toward the area covered by the survey. As part of its application, the company committed to drilling two wells in the expansion acreage — Iapetus No. 1 in early 2005 and Iapetus No. 2 in early 2006.


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Transportation of a drilling rig on an ice road.

ConocoPhillips drilled the first Iapetus exploration well in early 2005 to a measured depth of 9,300 feet and a true vertical depth of 7,986 feet. The company suggested at the time that the prospect could be a potential Alpine satellite but ultimately plugged and abandoned the well. Although the well was relatively close to infrastructure, the lack of a direct road made work expensive. It's "tough to get a rig up here," ConocoPhillips Alaska's Vice President of Exploration and Land Rick Mott said at the time. The project also required a coastal ice pad because "the prospect straddles the onshore and offshore."

Despite cost concerns, ConocoPhillips returned to the area in the 2007-2008 exploration season, drilling Char 1 a mile south of Iapetus. The company drilled the well to a measured depth of 7,697 feet and a true vertical depth of 7,647 feet. It encountered the top of the Nanushuk at 3,864 feet, the Kugaruk D at 7,217 feet, the Kugaruk C at 7,252 feet, the top of the Nuiqsut at 7,319 feet and the base of the Nuiqsut at 7,402 feet.

Production was tested in the Nechelik in three flow periods, for a total of nine days, from March 18 through March 24, 2008, with production ranging from as little as 12 barrels per day to as much as 358 bpd. A single flow test period in the Kugaruk in early 2008 produced from 831 bpd to 3,917 bpd. The well was ultimately plugged and abandoned after testing, likely due to the lack of

infrastructure in the area west of the Colville River.

CD5

ConocoPhillips commissioned the CD5 pad in 2015, after more than a decade of regulatory delays. The delays involved a proposed bridge across the Nigliq Channel of the Colville River, which separates state and federal lands on the North Slope.

The CD5 pad was an important milestone in North Slope development, allowing ConocoPhillips to more easily cross into the National Petroleum Reserve-Alaska.

The project generated considerable delays at the time, specifically regarding the location of a proposed bridge across the Nigliq Channel. The company began permitting

the project in 2005 but withdrew its application in 2008 in the face of local opposition from officials in the North Slope Borough and the village of Nuiqsut. After working with those parties on a new location for the proposed bridge, ConocoPhillips submitted a new application in 2009 only to be rejected by the U.S. Army Corps of Engineers the following year. ConocoPhillips successfully appealed, leading to regulatory approval in late 2011, project sanctioning in 2012 and initial construction activities in 2014.

The CD5 pad is in the National Petroleum Reserve-Alaska on land owned by Kuukpik Corp., the village corporation for Nuiqsut, with mineral rights owned largely

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CONOCOPHILLIPS *continued from page 25*

by Arctic Slope Regional Corp. The project marked the first production inside NPR-A.

ConocoPhillips viewed the CD5 project as a critical step in its decades-long effort to push North Slope development to the west. In the nine years since CD5 came online and allowed the company to cross the Colville River, ConocoPhillips has advanced several NPR-A projects, including Greater Mooses Tooth, Bear Tooth and the Willow project.

ConocoPhillips conducted the Alpine 3D survey in the area in late 2009 and early 2010 but has mostly focused on other sections of its leasehold in the years since. The proposed Titan 1 well site is approximately 800 feet south of the Char No. 1 exploration well.

In late 2018, the state approved the CD5X2 expansion project, which included as many as 10 new wells from the pad, as well as associated infrastructure. The company received a drilling permit in January 2024 for the CD5-32X exploration well from the pad. The well had not yet been reported as completed by the time the Explorers went to press in April.

Fiord West Kuparuk

The state approved the new Fiord West Kuparuk participating area in early 2019, covering much of this previous exploration play. ConocoPhillips was planning considerable work in the area before the disruption of the coronavirus pandemic in early 2020 but managed to complete the CD2X expansion project, adding 21 well slots and converting six existing well slots at the CD2 pad for extended reach drilling activities.

Bear No. 1

ConocoPhillips returned to exploration last year with the Bear No. 1 well, breaking a multiyear hiatus attributed to the pandemic and to a tax-related ballot initiative.

The company had commissioned a seismic survey over the proposed Bear exploration near the village of Nuiqsut in 2017 and 2018 and finally completed the Bear No. 1 well in early 2023. The well was drilled at the non-unitized state lease ADL 393519.

Having satisfied a key work commitment, ConocoPhillips subsequently received rental reduction on 74 leases covering 136,197 acres in the area. The block is adjacent to Santos' Oil Search (Alaska) leases, including its Stirrup and Horseshoe projects. The Bear project is widely understood to be ConocoPhillips' contribution to that same play.

ConocoPhillips Alaska President Erec

Isaacson previously described the Bear 1 well as a Brookian topset play. Reflecting on that, veteran Alaska oilman Bill Armstrong told Petroleum News, "A Brookian topset is exactly what we drilled at Pikka, Horseshoe, Stirrup, Mitquq and (ConocoPhillips) drilled at Willow. (ConocoPhillips) knows what they are doing. I give the Bear well a high chance of success based on what we know."

Stirrup No. 1 penetrated the Nanushuk reservoir and encountered 75 net feet of pay. The well flowed at a stabilized rate of 3,520 barrels of oil per day, one of the highest flow rates of any Nanushuk single-stage stimulation of a vertical well on the North Slope.

Armstrong Oil and Gas drilled the

Horseshoe 1 and 1A wells during the winter of 2016 and 2017. The wells confirmed the Nanushuk play in the Pikka-Horseshoe area as one of the largest onshore conventional hydrocarbon discoveries in the country in 30 years.

Reporting on Bear No. 1 in its annual Securities and Exchange Commission filing for 2023, issued in early 2024, ConocoPhillips wrote: "no commercial hydrocarbons were found and the well was deemed a dry hole and permanently plugged and abandoned." ●

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Glacier returns to exploration this year with Badami well

New ownership allows for project; Cook Inlet exploration pending derisking

By **ERIC LIDJI**
For Petroleum News

After a full year under new ownership, Glacier Oil & Gas is planning its next exploration campaign, focusing on the Badami unit in the eastern North Slope.

Through its subsidiary Cook Inlet Energy LLC, the small independent permitted two wells at the unit — the Badami B1-33 well and an associated pilot hole. Cook Inlet Energy received final Alaska Oil and Gas Conservation Commission permits in late January 2024 but neither well was reported as completed when The Explorers went to press in April.

Savant Alaska LLC operates the Badami exploration program on behalf of a string of independent owners. Savant is a wholly owned subsidiary of Cook Inlet Energy, which is a wholly owned subsidiary of Glacier Oil & Gas, which in turn is a subsidiary of SEP Alaska LLC, Smith Bay Company Alaska Inc. and JPD Family Holdings LLC.



STEPHEN RATCLIFF

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In recent years, Savant has identified several exploration and development prospects in the Badami and Killian sands at the Badami unit, including three within reach of the existing pad.

Pontem Energy and Sweat Equity Partners acquired Glacier Oil & Gas in January 2023, taking over the West McArthur River unit, Redoubt unit and associated Kustatan Production Facility in Cook Inlet and the Badami unit on the eastern North Slope.

The new ownership provided Glacier Oil & Gas with an improved economic outlook for exploration, allowing it to pursue a Killian well at Badami after years of deferrals.

Additionally, the state awarded royalty modification for seven Badami leases. The rates are “based on a sliding scale incorporating both oil price and production,” according to the decision from Department of Natural Resources Commissioner John Boyle. The sliding scale would never dip below 3% and would remain in place through 2030.

In permitting documents from December 2023, Savant proposed drilling the Kennicott B1-33 well using the Doyon 19 drilling rig from the existing Badami Main pad.

The company planned to build a 26.6-mile-long ice road from the Endicott/Duck Island Unit Road to the Badami Main pad and to build a temporary 50-man camp on the pad to support operations. Drilling would occur between January and late April 2024.

B1-33 would be the first exploration well at the unit since Badami B1-07 in early 2018.

In addition to drilling a Killian exploration well this year, Savant proposed several maintenance projects as part of its current plan of development running through May 2024. These include working over Badami B1-07 to restore production, continuing its ongoing study of the potential of commingling reservoirs in the B1-38 well and continuing its ongoing evaluation of acreage outside the participating area and the unit boundary.

The Badami B1-07 well was an important driver of production for the unit until its was taken offline in July 2022 following a stuck fish. Savant restored production in late May 2023. Badami oil production increased 79.5% between May and June 2023.



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History

BP Exploration (Alaska) Inc. brought Badami online in 1998, eager to close the 70-mile stretch of undeveloped acreage between Prudhoe Bay and the ANWR 1002 Area.

The compartmentalized reservoir at Badami complicated operations, forcing BP to frequently suspend work to allow reservoir pressure recharge. By the mid-2000s, some 876 barrels of oil per day were passing through a 38,500-bpd processing facility.

Taking a different approach, BP partnered with the small independent Savant Alaska in 2008 and then sold the field. Savant later became a subsidiary of Glacier Oil & Gas.

Savant stabilized production at around 1,100 barrels per day with the B1-38 and B1-07 Starfish wells and has regularly floated the possibility of exploring around the unit.

Badami East

In recent years, Savant has identified several exploration and development prospects in the Badami and Killian sands at the Badami unit, including three within reach of the existing pad. The others would require construction of the Badami East pad, a satellite connected by an 8-inch three-phase production pipeline and a 2-inch gas supply pipeline.

A plan to advance the project as part of a multi-well drilling program in the Lion and Rhino Killian prospects was deferred during the uncertainty of economic conditions in 2020 and 2021. The company now says that the project “will depend on securing approval for a multi-well program that will house the surface locations on the East pad.”

West McArthur River

The project at Badami is the primary exploration focus for Glacier Oil & Gas this year, although the company continues to pursue maintenance projects in Cook Inlet.

Through its subsidiary Cook Inlet Energy LLC, Glacier Oil & Gas owns the West McArthur River unit, the Redoubt unit, and the associated Kustatan Production Facility in Cook Inlet. All exploration opportunities at those units are currently on hold.

One of those exploration projects is the Sabre well at the West McArthur River unit.

Former operators Union Oil Company of California, Marathon Oil Co., Forcenergy Inc. and its successor Forest Oil Corp., and Pacific Energy Resources Ltd. all pursued the Sabre project. Cook Inlet Energy considered a Sabre exploration well as early as late 2013 but ultimately delayed the project due to its complicated logistics and high cost.

With the new ownership change, Glacier said it will focus on Badami but “plans to keep its options open for the high-risk Sabre prospect” and work to reduce project risks.

In the meantime, the company is focusing on maintenance activities.

Cook Inlet Energy completed the free water knock out project at the West McArthur River unit in September 2023, repurposing existing equipment. The WMRU-4D is now being used for produced water disposal and similar work is underway at WMRU-8.

The project allows Cook Inlet Energy to “intercept three-phase fluids from West McArthur River unit prior to leaving the pad to Kustatan Production Facility and collect a portion of produced water from the stream for disposal operations on the West McArthur River unit pad,” rather than injecting the fluids at the nearby Redoubt unit after processing at the Kustatan Production Facility, as had previously been done.

Cook Inlet Energy replaced failed electric submersible pumps at

Cook Inlet Energy completed the free water knock out project at the West McArthur River unit in September 2023, repurposing existing equipment. The WMRU-4D is now being used for produced water disposal and similar work is underway at WMRU-8.

the WMRU-2B and the Sword No. 1 wells in May and June 2023 and a separate project at WMRU-2B in September 2023 to replace a failed penetrator that jeopardized the newly replaced ESP.

Redoubt

As with West McArthur River, expansion plans at the Redoubt unit remain on hold. Cook Inlet Energy has perennially included the Northern and Southern fault blocks at the unit on its wish list but deferred both due to financial and geologic limitations.

The company performed an unsuccessful workover at the RU-2A well in July 2023.

The company had intended to replace an electric submersible pump but abandoned the project “after discovering that a major portion of the tubing and ESP assembly had parted in the hole, which will require special intervention in the future.” The complications prevented the company from fully vetting the results of a post-acid treatment at the well.

The company successfully replaced failed electric submersible pumps at the RU-5B well and the RU-7B well in August 2023 with weak acid stimulations, results pending. ●

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Great Bear Pantheon exploring for now and for later

Joint venture working on Ahpun field now and appraising Kodiak for future

By **ERIC LIDJI**
For Petroleum News

Great Bear Pantheon was the busiest explorer in Alaska last season, drilling four of the seven exploration wells completed on the North Slope during the 2022-2023 season: Alkaid No. 2 and an associated pilot hole, a pilot hole at its Talitha prospect, and the Theta West 1 exploration well — all near the Dalton Highway, south of Prudhoe Bay.



PAT GALVIN

The company also became a producer when it sold hydrocarbons produced during a production test at its Alkaid prospect and commissioned a modular production facility.

The joint venture holds a large swath of acreage on the North Slope, south of the Prudhoe Bay unit, straddling the Dalton Highway and the trans-Alaska oil pipeline. The acreage to the east is called the Ahpun project, while the acreage to the west is called the Kodiak project. This proximity to existing infrastructure has allowed the company to bypass some of the seasonal re-

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strictions that complicate other North Slope resource projects. The company is focusing on developing Ahpun in the near-term and appraising Kodiak in the near-term in preparation for future approval of development, expected in 2028.

In a statement released last March 2024, Pantheon said that initial modeling for a 10,000-foot lateral at Ahpun topset horizons supports “previously released analysis of (more than) 2 million barrels per well Estimated Ultimate Recovery and first year average production rate of 2,000 bpd of marketable

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liquids.” The company expects to release full reports soon, although nothing was available as The Explorers went to press in April.

In the statement, the company said it was “currently preparing drilling plans for a Megrez-1 well into eastern Ahpun Topsets from alongside Dalton Highway using either an ice pad for winter drilling or rig mats for summer drilling, again subject to funding.”

As part of its late March 2024 release, Pantheon said it was negotiating with the Alaska Gasline Development Corp. on a proposed agreement “to supply up to 500 million cubic feet per day of natural gas at exit of Ahpun gas plant at a base price not to exceed \$1/ million British thermal unit, with a final price subject to negotiation, for up to 40 years. Targeting delivery of initial volumes in 2029, ramping up to full capacity by 2032.”

History

Great Bear Petroleum LLC arrived in Alaska in 2010 with an ambitious plan to bring Lower 48 style source rock development to the massive North Slope petroleum system.

Following several seasons of drilling and seismic activity, and evaluating findings, the company launched a new strategy in the 2015 exploration season: using cash flow from conventional production to help finance a future unconventional development program.

Great Bear later partnered with British independent Pantheon Resources plc to create the joint venture Great Bear Pantheon. The joint venture has been pursuing three closely related prospects in the central North Slope, south of Prudhoe Bay, near the Dalton Highway: Greater Alkaid, Talitha and Theta West. As part of efforts to streamline administrative burden, these have been consolidated into the Kodiak and Ahpun fields.

In the December 2023 annual state lease sale, Great Bear Pantheon submitted high bids for 66,240 acres near its leasehold, “securing what Pantheon believes to be some of the highest quality areas of the Kodiak and Ahpun Fields at the shallowest depths.” The company currently holds some 193,000 contiguous acres across its Alaska leasehold.

Alkaid

Great Bear drilled the Alkaid No. 1 well in early 2015. Through its Great Bear Pantheon joint venture, it returned to the prospect in early 2019, re-entering the well to flow test it. Following the campaign, the company combined Alkaid with the nearby Phecda prospect into a single project, which became known as the Greater Alkaid prospect.

Great Bear Pantheon at one point planned to bring the field online as early as summer 2020, but the coronavirus pandemic and the subsequent crash in global oil prices squashed those plans. The joint venture returned in July 2022 with the Alkaid No. 2 well, a horizontal appraisal well designed for a long-term production test of relevant zones.

After partially resolving a blocked lateral, Great Bear Pantheon brought Alkaid No. 2 online in December 2022 at more than 500 barrels per day—including some 200 barrels of oil along with some natural gas liquids, condensate, and associated natural gas. The well sits on ADL 391706, approximately 16 miles southwest of the Deadhorse airport.

By January 2023, Great Bear Pantheon had sold more than

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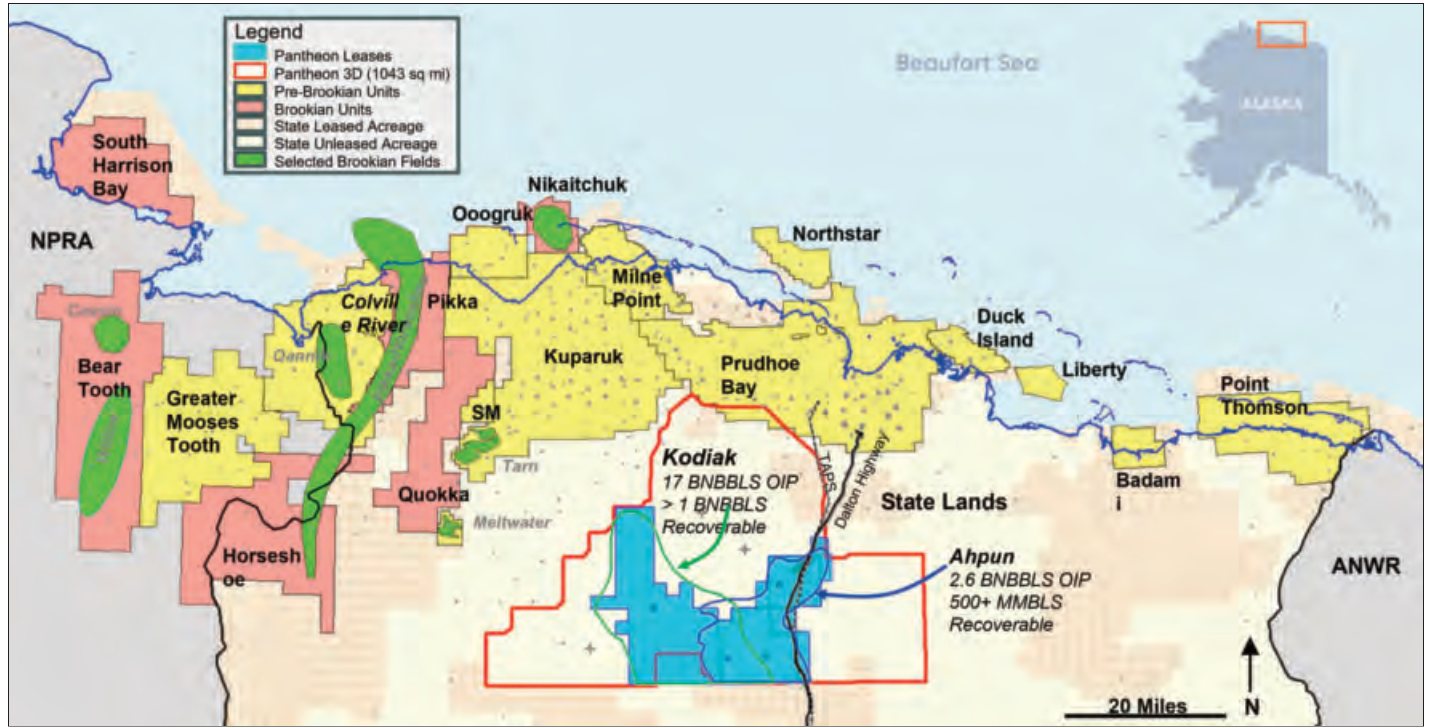
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GREAT BEAR PANTHEON *continued from page 31*

7,000 barrels to the trans-Alaska oil pipeline. The company estimated at the time it was realizing prices at 80-90% of Alaska North Slope crude oil or higher, based on the quality of its product.

The company initially trucked oil the market but later com-

missioned a modular Early Production Unit facility, allowing the company to shift to production, as needed.

Toward the end of 2023, Great Bear Pantheon re-entered Alkaid No. 2 well. The project was designed “to gather the best possible reservoir fluid samples for pressure-volume temperature, or PVT, analysis; to determine initial reservoir pressure;



and to test the improvements in the frack design discussed in recent Pantheon webinars.”

Talitha

The Talitha A well from 2021 encountered five oil horizons. A flow test the following year plugged the deep Kuparuk and tested the remaining zones. The well averaged 73 barrels of oil per day over a three-day period and some 40 barrels per day sustained on the final day of testing. The testing also confirmed deliverability, with the high-quality light oil moving easily through the vertical well, boding well for future horizontal wells.

Early on, Great Bear Pantheon described Talitha A as a re-drill of ARCO's 1986 well Pipeline State No. 1 but with the benefit of four decades of improved knowledge.

The company proposed but ultimately never pursued a roughly 9,800-foot vertical Talitha B well to the base of the Brookian sand, just above the HRZ interval, in early 2023.

Theta West

Following its 2022 season, Great Bear Pantheon commissioned contingent resource reports of the Alkaid and Theta West projects from Netherland Sewell and Associates.

The company released the Theta West report in mid-2023, confirming estimates of 962 million barrels of oil for the Lower Basin Floor Fan reservoir of the Kodiak field.

Great Bear Pantheon drilled the 8,450-foot vertical Theta West No. 1 well in the central North Slope in late January 2022 using Nordic Calista Rig 3. It was a step out from Talitha A, 10.5 miles away, and it was intended to confirm oil quality, oil mobility and reservoir deliverability in preparation for a future

Early on, Great Bear Pantheon described Talitha A as a re-drill of ARCO's 1986 well Pipeline State No. 1 but with the benefit of four decades of improved knowledge.

horizontal production well.

In late March 2022, the company announced that the well had produced an average of 57 barrels of high quality light oil per day with a peak rate exceeding 100 barrels per day.

The well also helped define the aerial extent of the discovery, which the company says extends all the way to ARCO's Pipeline State No. 1 well drilled in the late 1980s.

Theta West was a top discovery worldwide in 2022, according to Wood Mackenzie. "In fact, it was the largest onshore discovery last year," Pantheon CEO Jay Cheatham said in June 2023. "It was in the top five, but the largest onshore and the only one in a tax royalty regime; all the others are in deep water production sharing contracts offshore."

Before the release of the resource estimate, Pantheon acquired additional acreage due north of its acreage — a long vertical strip the company has described as a "chimney."

"We need to drill a well in that (additional acreage), subject to funding of course," Cheatham said in June 2023. "We've got certainly an upgrade in our resource from that acreage; we won't say a whole lot about that until Netherland and Sewell have completed their report, but it's got billions of barrels of oil in place and in that chimney area." ●

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Photo Courtesy of Mark Theriault

Whiskey and Cotton for Hilcorp this winter

Major Alaska producer continues test well strategy at Cook Inlet prospects

By **ERIC LIDJI**
For Petroleum News

Throughout its 13-year tenure in Alaska, Hilcorp Alaska LLC has devoted most of its exploration energies toward expanding existing natural gas and oil production in the Kenai Peninsula and more recently existing oil production on the North Slope.

The Texas-based independent came to Alaska to revitalize a large portfolio of fields that had long been the most prolific in the Cook Inlet basin but required new investment.

Within that portfolio, though, was acreage in the Kenai Peninsula south of Kasilof that held a different opportunity: a sequence of under-explored units surrounded by promising exploration acreage. These include the Ninilchik unit, the Deep Creek unit and the Seaview unit, as well as the associated Pearl, Whiskey Gulch and Cottonfield prospects.

This year, the company is continuing that effort with planned exploration campaigns at the Whiskey Gulch and Cottonfield



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prospects — two prospects it has explored before.

Hilcorp drilled a large number of test and exploration wells at Whiskey Gulch in 2019, 2020 and 2022 and also at Cottonfield in 2022. In both cases, the company expected to convert its exploration activity into applications for new units and participating areas.



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Whiskey Gulch

In plans presented for this past winter, Hilcorp proposed drilling the 8,491-foot Whiskey Gulch No. 15 well. It would be a delineation well, adding to the knowledge gained through 12 previous stratigraphic test wells and two exploration wells at the prospect.

The company planned to spud in January 2024 and test the well for 30 days.

No results have been released from Whiskey Gulch drilling. Previous exploration wells targeted “unproved oil and/or gas reserves in the Sterling, Beluga, and Tyonek formations within the Whiskey Gulch Undefined Oil and Gas Pools,” according to Hilcorp. “There was some gas found in each well but neither are commercially viable at this time.”

The Whiskey Gulch field is located some 2.5 miles north of Anchor Point on the southern Kenai Peninsula, directly north of the Hilcorp-operated Seaview unit. The company brought Seaview online in 2021 but the unit has been offline since September 2022.

As it has often done in Cook Inlet, Hilcorp started with a stratigraphic test well program that transitioned into a traditional exploration venture. Toward the end of 2019, the company received Alaska Oil and Gas Conservation Commission permits for five shallow stratigraphic test wells on private land near Anchor Point: Whiskey Gulch 1-B, Whiskey Gulch 2, Whiskey Gulch 3, Whiskey Gulch 7 and Whiskey Gulch 10.

In November 2019, the company drilled all but Whiskey Gulch 3. The following year, it received seven additional permits: Whiskey Gulch 4, Whiskey Gulch 5A, Whiskey Gulch 6, Whiskey Gulch 9A, Whiskey Gulch 11, Whiskey Gulch 12 and Whiskey Gulch 13. In July 2020, the company completed all seven test wells, in addition to Whiskey Gulch 3.

Hilcorp proposed a two-well exploration program on private lands at the end of Cape Ninilchik Avenue. The company drilled Whiskey Gulch No. 1 over the latter half of 2021 targeting oil and gas to the southeast and Whiskey Gulch No. 14 in early 2022 targeting gas to the northeast. The company returned in early 2023 for a 2D seismic program.

In permitting documents for Whiskey Gulch No. 14, Hilcorp said that analysis of Whiskey Gulch No. 1 and wells from surrounding fields “suggests that the Whiskey Gulch Undefined Gas Pool consists of a series of thin, discontinuous, stacked channel

Whiskey Gulch and Cottonfield both follow a strategy Hilcorp has repeated throughout the Kenai Peninsula: drilling stratigraphic test wells in preparation for exploration wells.

sands with a low net-to-gross ratio,” requiring tighter spacing than other fields.

Given the complexity of land ownership in the southern Kenai Peninsula, Hilcorp would almost certainly need to apply for a participating area to develop Whiskey Gulch.

Cottonfield

In the summer of 2022, Hilcorp drilled 10 wells at its Cottonfield prospect in the southern Kenai Peninsula, east of the Cosmopolitan unit: Cottonfield No. 1, Cottonfield No. 2, Cottonfield No. 3, Cottonfield No. 4, Cottonfield No. 5, Cottonfield No. 10, Cottonfield No. 11, Cottonfield No. 12, Cottonfield No. 13 and Cottonfield No. 14. (An additional well, Cottonfield No. 9, was also permitted but has not been reported as completed.)

This winter, the company planned to

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HILCORP *continued from page 35*

drill the 7,838-foot Cottonfield No. 6 well, which would target unproven gas reserves in the Sterling, Beluga and Tyonek formations.

The proximity of the proposed well to nearby residences forced the company to apply for a spacing exemption. A hearing in January 2024 yielded much concern from neighbors.

In February 2024, Hilcorp received approval for its Sterling Highway 2D seismic program. The program would cover some 46 miles between Clam Gulch and Anchor Point. It would include two vibe trucks, up to 1,240 sonic nodes and a utility terrain vehicle placing nodal receivers every 27.5 feet set back 10 to 25 feet from the roadway.

Public commenters raised concerns about increased noise and traffic associated with the program. Hilcorp claimed that the program would not exceed normal noise for highway traffic and that the program would run during the off-season for peak tourist activities.

Associated with the program, Hilcorp applied for the Southern Kenai Transition Zone seismic program. The program includes as many as 60.2 miles of nodal seismic covering offshore, onshore and tidal zones between Ninilchik and Anchor Point over six weeks.

In February 2024, Hilcorp received approval for its Sterling Highway 2D seismic program. The program would cover some 46 miles between Clam Gulch and Anchor Point. It would include two vibe trucks, up to 1,240 sonic nodes and a utility terrain vehicle placing nodal receivers every 27.5 feet set back 10 to 25 feet from the roadway.

Strategy

Whiskey Gulch and Cottonfield both follow a strategy Hilcorp has repeated throughout the Kenai Peninsula: drilling stratigraphic test wells in preparation for exploration wells.

A quick summary:

- Seaview: aerial surveys in 2015, seismic in 2016, seven shallow stratigraphic wells in mid-2017, the Seaview No. 8 exploration well in late 2018, and production in June 2021.
- Deep Creek SW: two stratigraphic test wells in late 2017 associated with the Greystone prospect and the Middle Happy Valley area of the onshore Deep Creek unit.
- Pearl: seven stratigraphic test wells in mid-2017, three exploration wells in 2022, followed by the new Pearl participating area and an expansion of the Ninilchik unit.
- Whiskey Gulch: four stratigraphic test wells in late 2019, eight more in 2020, a two-well program in late 2021 and early 2022 and a 2D seismic program in early 2023.
- The Yukon Flats Basin in the Interior: airborne gravity survey in summer 2020, 13 stratigraphic test wells (Birch Creek, Canvasback and Saloon Island) in mid-2021.
- Happy Creek: seven stratigraphic test wells in mid-2022.
- Cottonfield: 11 stratigraphic test wells in mid-2022.

Beyond the inlet

In addition to the Kenai Peninsula, Hilcorp has expressed an interest in three other exploration basins: the Yukon Flats basin, the Iniskin basin, and the Blackbill prospect.

Following long and ultimately unsuccessful land swap negotiations with the U.S. Fish and Wildlife Service, Doyon Ltd. signed an agreement in December 2019 with Hilcorp guiding exploration

In addition to the Kenai Peninsula, Hilcorp has expressed an interest in three other exploration basins: the Yukon Flats basin, the Iniskin basin, and the Blackbill prospect.

activities in the 1.6 million-acre Yukon Flats region.

Hilcorp conducted an airborne gravity survey in summer 2020 and drilled 13 of 15 permitted stratigraphic test wells in mid-2021: Birch Creek No. 1, No. SE1, No. 3, No. 4, No. 5 and No. 6, Canvasback No. 1 through No. 6 and Saloon Island No. 2. The Birch Creek wells were clustered at 16N/10-11E and 17N/7-8E. The Canvasback wells were located at 18N/7-8E. The Saloon Island wells were at 18N/12-13E and 19N/12E.

The partnership has produced little public information in the three years since that stratigraphic campaign. On its website, Doyon writes, "The next steps could be a seismic program or no activity," adding "Additional phases of the exploration project depend on several factors, including analysis of the aerial survey data and stratigraphic test results."

The Iniskin Peninsula is on the west side of Cook Inlet near the mouth of the Inlet.

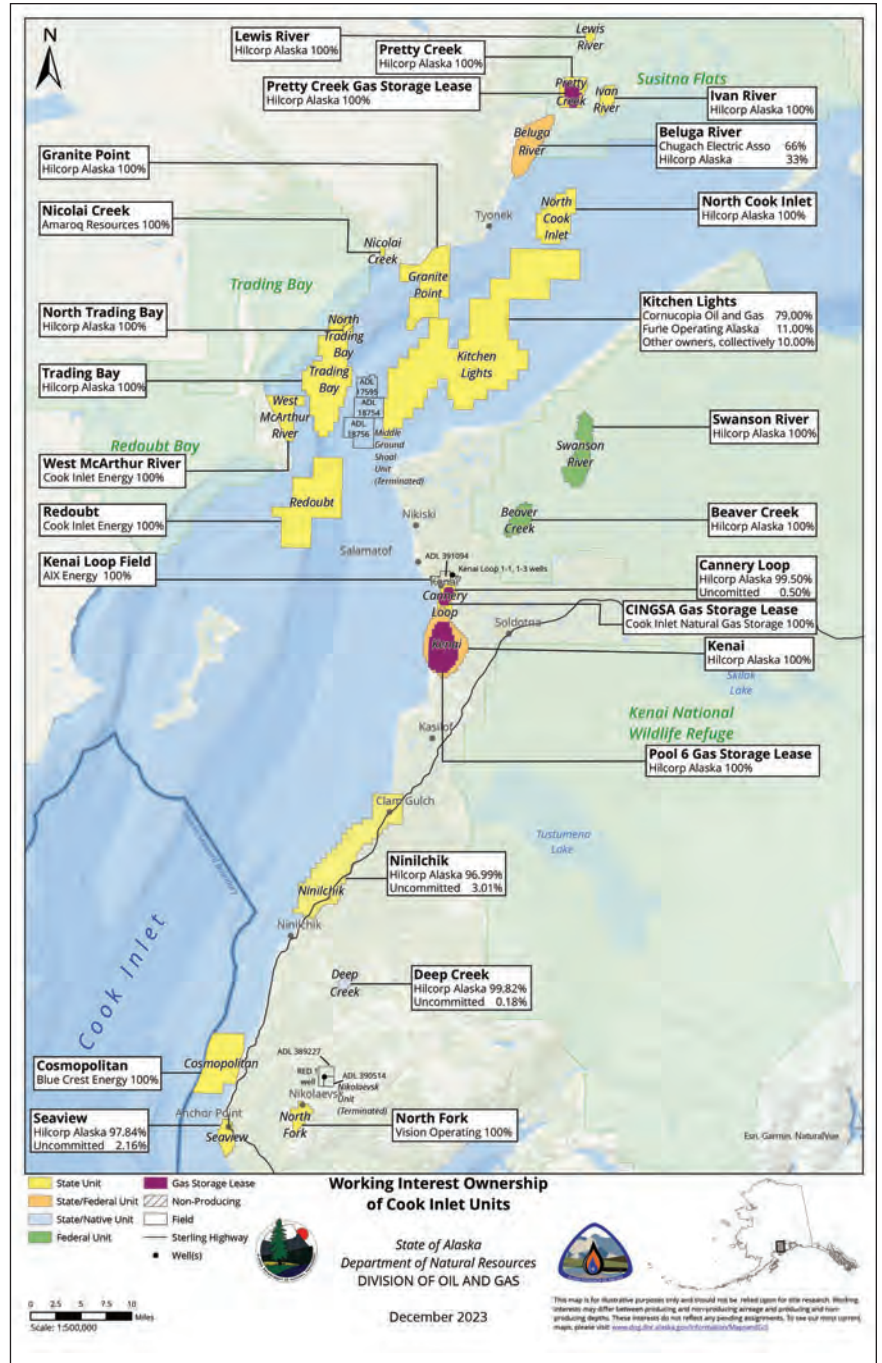
Hilcorp conducted a 2D seismic survey over the Iniskin Peninsula in 2013. The survey suggested a deeper crest of an anticline in the area that had previously been overlooked.

The company acquired additional acreage but has yet to announce a drilling program, kept away by a combination of physical remoteness and some geologic complications.

Hilcorp also holds leases at the Blackbill prospect in the Cook Inlet outer continental shelf. It conducted a 3D seismic survey in 2019 and a geohazard survey in 2021.

Despite publicly released plans calling for two-to-four exploration wells between 2020 and 2022, the company had not yet permitted or drilled any Blackbill wells by early 2024. ●

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Jade's Sourdough project on hold

Goal to deliver oil to Skid 50 meter as soon as Q2 2025

By **KAY CASHMAN**
Petroleum News



ERIK OPSTAD

In its sixth and latest annual plan of development, or POD, Jade Energy LLC proposes to move the Sourdough development project forward with the goal of delivering oil to the Skid 50 meter as soon as the second quarter of 2025, with an overall objective of the project to come fully online to produce 35,000 barrels of oil per day by 2028.

This would make Sourdough the next project in the queue for supporting construction and operation jobs in Alaska's oil and gas industry.

The Alaska Department of Natural Resources and its Division of Oil and Gas were clearly supportive of Jade's efforts to drill an exploration/appraisal well into BP's Sourdough discovery until Dec. 21, 2022. Then everything changed, putting the entire project on hold.

The parties are, however, talking.

Readers can follow that story in the weekly Petroleum News.

Brookian reservoirs

Erik Opstad's Jade Energy is 100% working interest owner of

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ADL 343112 Segment 2 in Area F of the Point Thomson unit on the eastern North Slope.

Going back in history, Area F was created more than a decade ago as part of the Point Thomson unit settlement talks between the state of Alaska and the PTU working interest owners. They brought together 7,647 acres of non-contiguous leases in the northeast and southeast corners of the Point Thomson unit. Jade's Sourdough project targets the southeastern leases, known as Tract 32.

Potential Brookian reservoirs have been encountered by numerous wells drilled in and near the Point Thomson unit since the 1970s.

... overall objective of the project to come fully online to produce 35,000 barrels of oil per day by 2028.

Jade's acreage holds BP's two mid-1990s oil discovery wells, Sourdough 2 and 3. BP drilled the 12,562-foot Sourdough No. 2 well in March 1994 and the 12,475-foot Sourdough No. 3 well in March 1996.

In 1997 BP estimated the prospect held 100 million barrels of recoverable oil.

But BP never pursued development because at the time there was no pipeline near the Sourdough prospect which borders the 1002 Area of the Arctic National Wildlife Refuge.

One hundred million barrels of oil did not justify the cost of a pipeline and related facilities. The Point Thomson project had yet to be developed, and even with it, Sourdough development was considered by state of Alaska and Jade officials as uneconomic, carrying a 40% net profit share burden plus a 12.5% royalty.

Nonetheless, Jade's Sourdough project has steadily been gaining ground since the initial 3D seismic survey covering the Sourdough prospect (Yukon 3D data set), which was conducted by Jade stakeholders in 2018.

Jade has demonstrated a continuous record of ongoing technical and field work to advance understanding of the high pressure reservoir and requirements for its potential development, spending approximately \$20 million to date.

Land use permit

Jade applied for a 5-year off-road travel land use permit in late May 2023 with DNR's DOG.

According to the public notice posted by the division the permit was for "off-road travel, ice construction, and associated activities on

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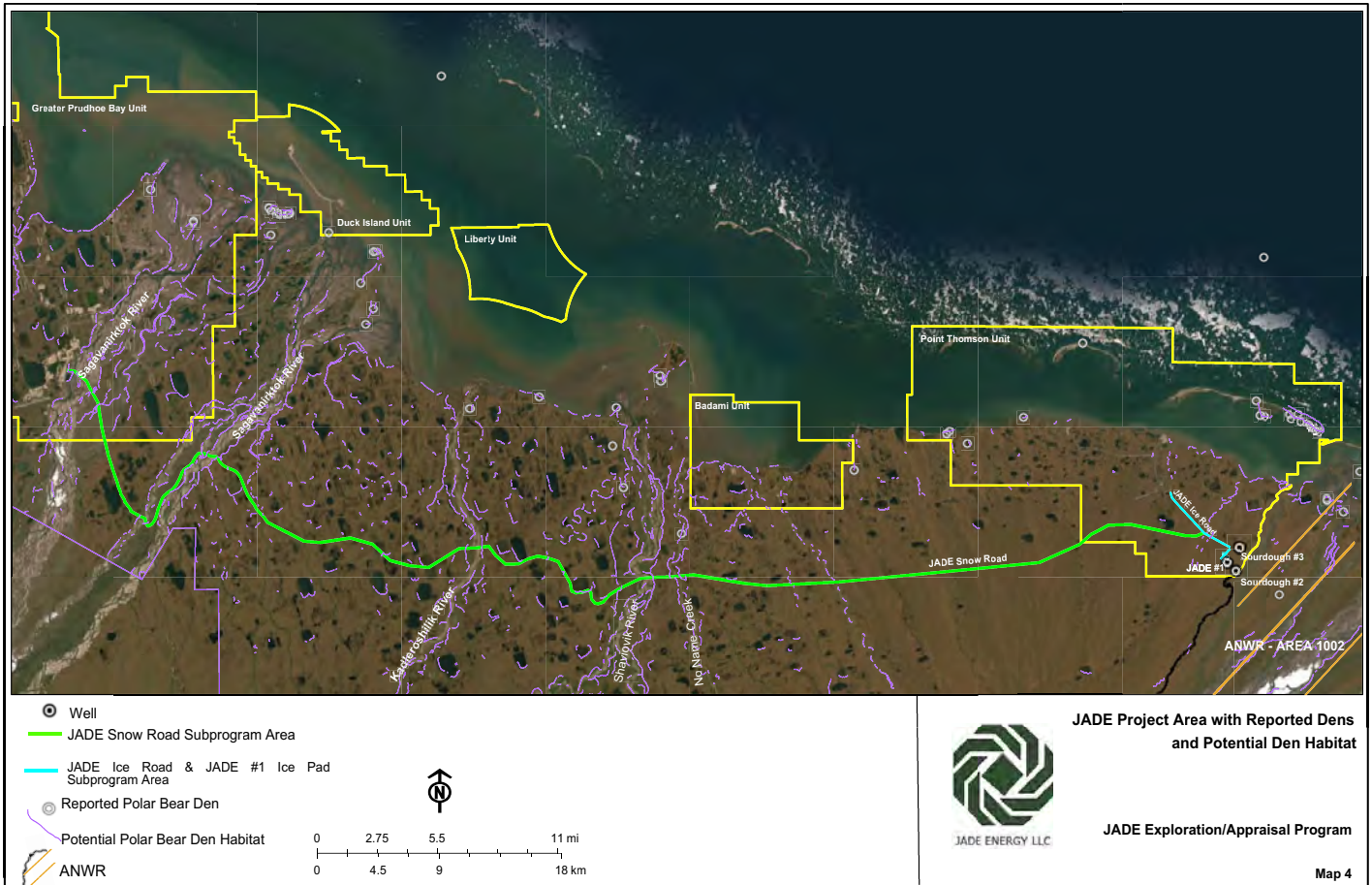
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state land between the Canning and Colville Rivers. Activities would be in support of oil and gas operations using approved vehicles,” specifically for “off-road travel and ice/snow trail construction for the Jade 1 Exploration Program.”

In fact, it was more of an appraisal and development program, than an exploration program since BP had already done the Sourdough exploration.

Jade asked in its application to end the 5-year permit in 2027. The months of each year in which the permit was needed were December through July.

Drilling and support operations for Jade 1 were to take place in winter 2023-24 during the open tundra winter travel season and were to be supported by using the 61.5-mile Jade snow road that would run from Deadhorse to the Point Thomson unit.

The Jade 1 ice drill pad would be accessed by the 4.2-mile Jade ice road running from the PTU gravel lease roads to Jade 1 and by the Jade ice airstrip which would be adjacent to the pad.

Jade also might opt to drill additional wells and/or re-enter and test existing wells on its lease in the future. This might require revised alignments for snow roads, ice roads and airstrips, and ice pad locations within the Arctic Coastal Plain in an area bounded by the Sag River to the west and the Staines River to the east.

Jade had a facility sharing agreement with ExxonMobil Alaska Production Inc. and Hilcorp North Slope LLC to use PTU facilities and heavy equipment.

Opstad told Petroleum News June 5, 2023, that Jade 1 would be drilled to a depth of about 12,500 feet true vertical depth.

Jade’s application said drilling would evaluate stacked conventional objectives within the Brookian, before plugging back and side-

Jade’s acreage holds BP’s two mid-1990s oil discovery wells, Sourdough 2 and 3. BP drilled the 12,562-foot Sourdough No. 2 well in March 1994 and the 12,475-foot Sourdough No. 3 well in March 1996.

tracking into a horizontal production completion.

In its lease plan of operations filed in early May 2023 with DOG, Jade said drilling was expected to include laterals, sidetracks or additional penetrations from the same pad.

“Half the project is funded at this time; we’re still looking for investors,” Opstad said in the June 5, 2023, interview with Petroleum News.

At that time Opstad seemed confident that the company would be able to raise the money it needed to move forward with its plans for Jade 1.

(Those investors backed off the project starting Dec. 21, 2022, when DNR/DOG took the position of a hostile agency, Opstad said.)

One challenge Opstad was focusing on in June 2023 was the “enormous strain” on the supply chain because of the “extremely elevated activity level on the North Slope” from projects such as Pikka Phase 1, Willow and Lagniappe’s exploration program.

Editor’s note: As of March 2024 Jade had completed nearly all permitting required to deliver the drilling program. The few permits not in hand are waiting on the resolution of administrative issues with DNR/DOG. ●

*Contact Kay Cashman
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