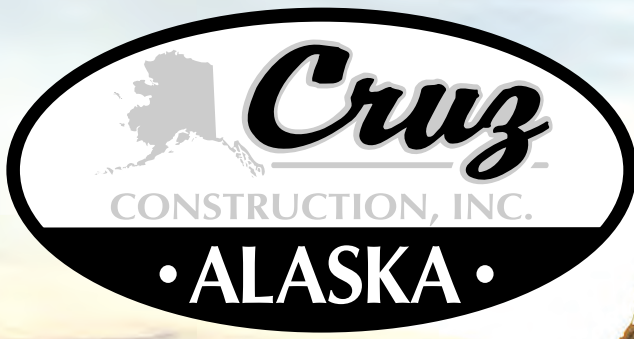


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On the cover: The Horseshoe exploration well and sidetrack, drilled by operator Armstrong Energy LLC in partnership with Repsol, extended the play discovered at Pikka by 20 miles, establishing the field as a major discovery.

Photo by Judy Patrick, courtesy of Armstrong Oil and Gas

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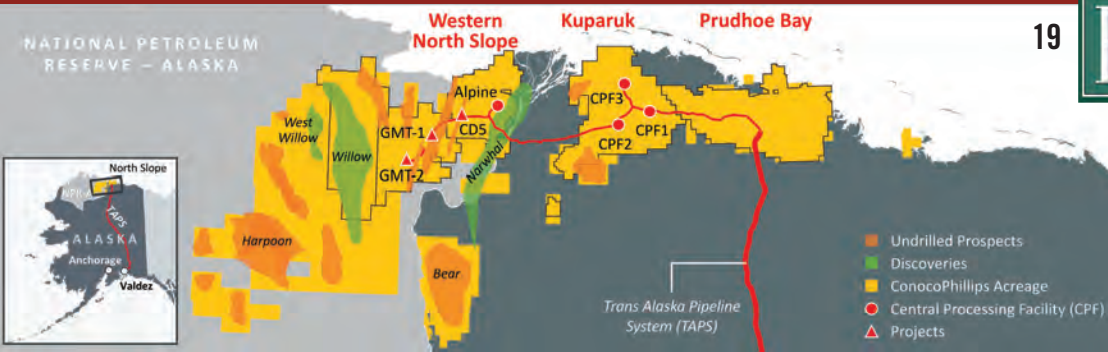
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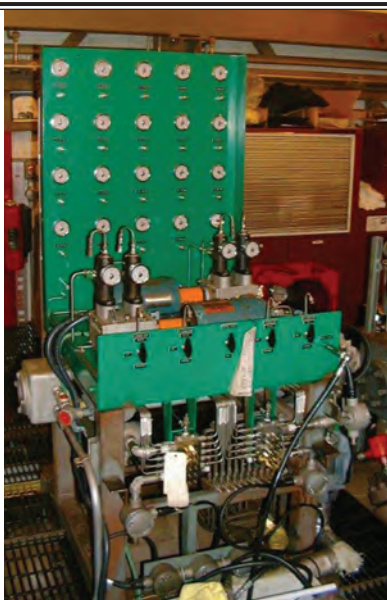


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DNR evolving to address new industry challenges, opportunities

By **CORRI A. FEIGE**

Commissioner, Alaska Department
of Natural Resources

Whoever wrote “there’s nothing new under the sun” probably never worked in the Alaska energy industry! New technologies, laws, problems and opportunities seem to arise at an ever-increasing pace, challenging those in the industry to remain nimble and adaptive if they are to thrive, or even survive.

We in state government, working in partnership with private industry to responsibly develop Alaska’s natural resources, are not immune to the challenges of adapting to constantly changing industry practices and market demands. The Alaska Department of Natural Resources is working hard to meet changing conditions head-on, reorienting its divisions to better serve needs of our established oil and gas industry, while also standing up programs to encourage and manage Alaska’s newest energy sector: geothermal.

Grounded in state statutes and regulations, DNR’s activities best fulfil our constitutional obligations when they reflect practical considerations, particularly so when faced with Alaska’s declining oil production volumes and aging infrastructure. We in DNR have therefore been busy finding new ways to manage our current programs supporting the state’s oil and gas industry more efficiently. These changes will help provide oil and gas explorers and producers a more streamlined, one-stop shop for permitting activities to the greatest extent possible.

Significant realignments for permitting

In recent months, DNR has made some significant realignments of the responsibilities for permitting activities relating to oil and gas development between the two divisions most closely involved: the Division of Oil and Gas, DOG, and the Division of Mining, Land and Water, DMLW.

We believe those seeking permits to operate in Alaska deserve state permitting teams who are responsive to industry needs, communicate clearly and consistently, and cooperate instead of confront. Both the public interest and the interest of the producers conducting business here demand transparent, consistent, clear, reasonable and logical direction from the state that is firmly founded in law, matched with responsible resource and land management and oversight that makes practical sense and does not create inefficient, duplicative processes.

DNR has therefore reoriented DOG and DMLW to work cooperatively to issue decisions and authorizations effectively and efficiently in the service of DNR’s constitutional mandate to develop, conserve and maximize the use of Alaska’s natural re-



CORRI FEIGE

One of our more notable changes is that surface leasing on state land for oil- and gas-related activities will no longer be authorized and managed by the professionals in DMLW, but by those in DOG.

sources consistent with the public interest.

DOG is the lead division for all permitting and regulatory activities directly related to oil, gas and geothermal activities. This includes, but is not limited to, geological and geophysical surveys and seismic data acquisition, pipelines and supporting infrastructure (both common carrier and non-common carrier pipelines), hydrocarbon processing plants, seawater treatment plants and other facilities supporting infrastructure or activities in the normal course of exploration, development, production and transportation of oil, gas or geothermal resources.

DMLW is the lead division for all DNR land use authorizations not directly related to oil, gas or geothermal activities. This includes opening and closing dates for tundra travel, mineral extraction (excluding oil, gas, and geothermal resources), material sales and water use not authorized under AS 38.35, the Right-of-Way Leasing Act.

Notable surface leasing change

One of our more notable changes is that surface leasing on state land for oil- and gas-related activities will no longer be authorized and managed by the professionals in DMLW, but by those in DOG. As a result, operators hoping to develop a project are much more likely to receive all their required authorizations from a single division, easing communications with the state, smoothing the regulatory process and speeding progress toward mutual success.

When it comes to inspections, DOG and DMLW will retain their responsibility for conducting site visits to ensure operators are meeting the conditions of their leases, permits and other authorizations. However, the divisions will work harder to coordinate compliance visits to minimize overlap, reduce redundancy and create cost-efficient and effective compliance programs that both accomplish compliance objectives and make good common sense.

DR&R Feige’s responsibility

Dismantlement, removal and restoration are the inevitable last stage of any project, and one of my responsibilities as commissioner is approving final DR&R plans so the land may be returned to the state in good condition. To simplify on-the-ground contact with regulators during this process, the lead DNR divisions responsible for managing primary activities will continue to be responsible for managing DR&R as well — of course, in

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FEIGE *continued from page 6*

coordination with other DNR divisions, and with the Alaska Oil & Gas Conservation Commission, the Department of Environmental Conservation and the Department of Fish & Game as necessary.

DOG and DMLW will soon distribute new materials to explain which division will handle specific authorizations. In the meantime, if operators have specific questions about a potential authorization, they are welcome to contact either DOG or DMLW, who will be happy to point them in the right direction.

These changes may require us to establish new relationships or learn new skills, and change is never easy. However, it's been said that if we want things to get better, we must be willing to let things change. I believe DNR's changes related to oil, gas and geothermal permitting and authorizations should go a long way to simplifying things in the long run and making operating in Alaska more mutually pleasant, productive and profitable.

Supporting geothermal

At the same time DNR is working to realign our permitting activities for established energy sectors, we are also working to encourage efforts to coax a new source of energy from beneath Alaska's surface: geothermal energy.

There is growing recognition in Alaska of the opportunity that geothermal energy presents to provide a reliable source of energy, especially for rural communities and remote resource extraction sites. Geothermal energy can provide uninterrupted power for electricity generation and space heating based on com-

Senate Bill 104 and House Bill 135 would update Alaska's geothermal statutes to be more in line with the terms and conditions of oil and gas exploration licensing.

mercially available technology.

Since 1983, the state has held four geothermal lease sales: three in the Mount Spurr area and one on Augustine Island. These areas were deemed prospective for geothermal energy based on substantial indications of geothermal resources and attractive targets for competitive sale of tracts.

While this program has provided the state with valuable data to help us understand the resource potential, the state's current geothermal program has not had resounding success. Whether due to tight caps on total lease acreage, strict conversion requirements, technical challenges or other factors, application of geothermal technology in Alaska is limited, none of the four leases have produced paying quantities and no commercial grade resources have been discovered on state lands.

However, that may be changing. Governor Dunleavy has worked with our experts in the Division of Geological & Geophysical Surveys and DOG to introduce legislation aimed at improving our record. Senate Bill 104 and House Bill 135 would update Alaska's geothermal statutes to be more in line with the terms and conditions of oil and gas exploration licensing.

The proposed legislation would match our existing oil and gas exploration program by changing "permits" to "licenses" and providing for a five-year geothermal license term, with a similar optional one-year extension. This increased term further supports opportunities for exploration in areas far from existing infrastructure. In addition, the maximum license acreage would double from 51,200 to 100,000 acres to provide explorers greater latitude to identify the subsurface resource for surface expressions of geothermal indications, such as hot springs.

These bills would significantly change the process of converting an exploration license to a non-competitive geothermal lease, based upon the completion of an agreed upon work commitment and submission of a plan of exploration. Such a work commitment would follow the oil and gas model, in which the work commitment is expressed in direct exploration spending.

Two companies have recently expressed interest in geothermal exploration near Mount Spurr. DOG has issued a two-year permit to explore state land near Mount Spurr to Raser Power Systems of Utah and has issued a preliminary finding proposing a similar permit to Alaska-based GeoAlaska. These explorers could be the first to see their exploration permits converted to non-competitive leases under the bills.

The bills would also change statute by modernizing the definitions for geothermal resources and geothermal fluids to account for advancements in technology that enable the use of resources at a greater temperature range.

Whether these changes will succeed in making geothermal energy a viable industry in Alaska may be uncertain. But it was not all that long ago when oil production in Alaska seemed like a long shot — and, as Wayne Gretzky famously said, "you miss 100% of the shots you don't take." With a little luck, and a willingness to embrace change, we could find ourselves injecting new energy into Alaska's economy ... by discovering a new source of Alaska energy. ●

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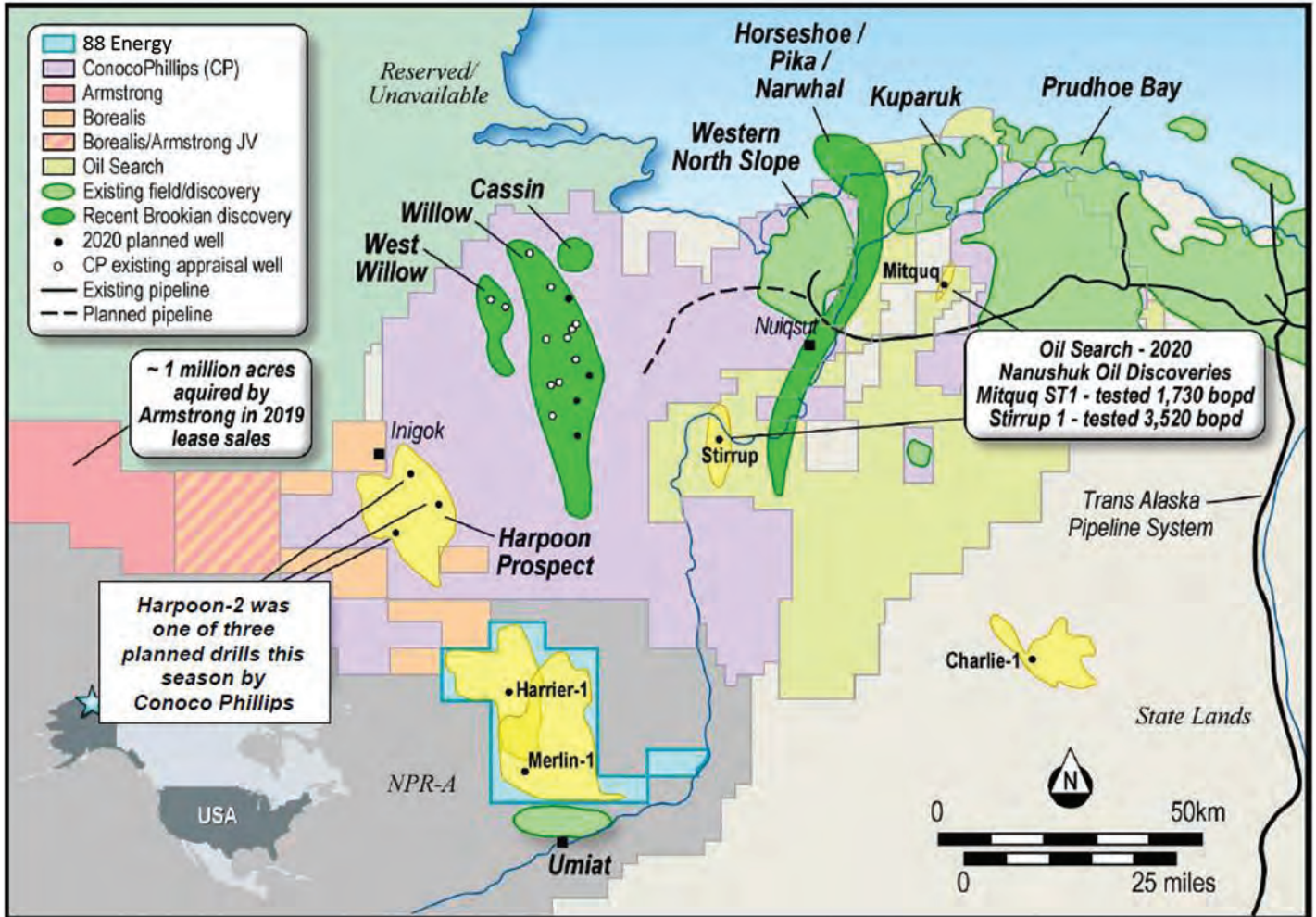
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This 88 Energy map ran in the Jan. 17, 2021, issue of Petroleum News.

88 Energy takes lead in hunt for Nanushuk

Merlin well yields promising results, including new extensive interval, but snow road deterioration, operational issues prevent sampling of 2 prospective zones

By **KAY CASHMAN**
Petroleum News

88 Energy Ltd. introduced a new exploration play-book for the winter of 2021 that is a game changer for the North Slope in terms of saving time and money and thus making Alaska more affordable for small-to-mid-sized operators.

The Australia independent drilled the Merlin 1 exploration well in its Peregrine project in the National Petroleum Reserve-Alaska on acreage acquired in a 2020 off market takeover of XCD Energy.

The Merlin well, whose main target was the prolific Nanushuk reservoir, was drilled by one of 88 Energy's four



ERIK OPSTAD

Alaska operating subsidiaries, Emerald House — all the subsidiaries are run by long-time Alaska geologist and innovator Erik Opstad.

Opstad used All-American Rig 111, a lightweight, inexpensive portable rig that did not require an ice road for Merlin 1.

The shallower Nanushuk wells do not need the use of a rotary rig, or an ice road which is required to transport the heavier traditional North Slope exploration rigs.

Rig 111 was moved in pieces during the off-road winter season by tundra-safe track vehicles on snow trails.

Although the use of snow roads and lightweight, portable

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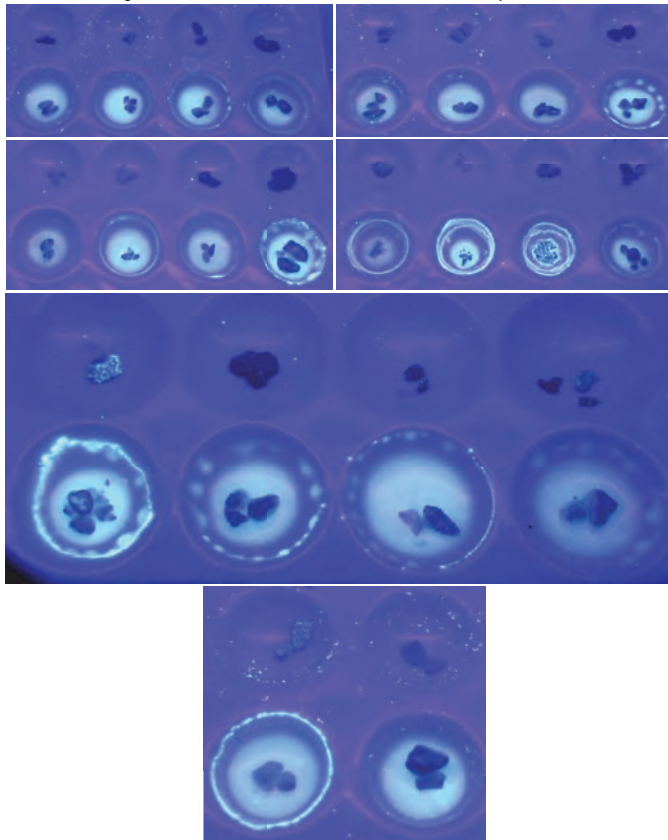
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Fig. 1 Oil Shows: Fluorescence and Cut Observed over Multiple Intervals



88 ENERGY *continued from page 10*

rigs has been studied and considered by XCD, Armstrong and Oil Search, 88 Energy was the first to conduct such a program on the North Slope.

Merlin 1 was spud March 10, 2021.

On March 22, 88 Energy reported that drilling had reached a depth of 1,512 feet, where surface casing was cemented in place and the blowout preventer system tested.

Following a successful formation integrity test, the rig continued to drill toward targets in the Nanushuk formation. The planned total depth for the well was 6,000 feet.

The Willow connection

Merlin is considered a direct analogy to ConocoPhillips' Willow oil discovery, while ConocoPhillips' Harpoon prospect "is interpreted to lie on the same sequence boundaries as the Harrier prospect," also in 88 Energy's Peregrine project (see map in the pdf and print versions of this story).

Plans to drill a Harrier 1 well during the 2021 winter season were dropped by 88 Energy because of delays caused by a Biden Executive Order.

The Harrier and Merlin prospects lie between the Umiat oil field to the south and Willow and Harpoon to the north.

In its 2020 annual report, 88 Energy's non-executive Chairman Michael Evans said March 9, 2021, that Merlin 1 was "targeting 645 million barrels of gross mean prospective resource." Harrier 1, expected to be drilled in the winter 2022, will target a gross mean prospective resource of 417 million barrels.

A deeper Torok objective in the Harrier prospect lies at about 10,000 feet. As of April 12, 2021, 88 Energy has announced no plans to drill it.



NAME OF PARENT COMPANY:

88 Energy Ltd.

NAME OF ALASKA COMPANY:

88 Energy Alaska Inc.

ALASKA OPERATING SUBSIDIARIES:

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TOP ALASKA EXECUTIVES: David Wall, managing director of 88 Energy Ltd. (oversees Regenerate)

Erik A. Opstad, general manager Alaska operations (oversees Accumulate, Captivate)

COMPANY WEBSITE: www.88energy.com

An independent report for XCD that was generated by ERC Equipoise said Harrier Deep had a mean unrisks recoverable prospective resource of 572 million barrels.

About 500 feet thicker

88 Energy said March 29, 2021, that "interpretation of logging while drilling data indicates multiple potentially hydrocarbon bearing zones" were encountered in the Nanushuk formation.

The company further said March 31 that wireline logging was underway and that the Nanushuk formation was "encountered at ~600' low to prognosis and is interpreted to be ~500' thicker than that encountered in the wells drilled into the Willow oil field" analogue wells to the north of the Peregrine acreage. (Oil Search well Pikka B intersected the thickest Nanushuk reservoir seen in the area to date — some 350 feet of pay as compared to average thickness farther north in the Pikka unit of some 200 feet and 40 to 70 feet farther west at Willow.)

"Encouragingly, the gamma log indicates the presence of more sand packages than those in the analogue wells and ... the sand packages in Merlin 1 are generally cleaner in nature. ... Oil shows were recorded over multiple intervals in the Nanushuk while drilling, including the primary targets," 88 Energy reported.

Fluorescence "ranged from relatively weak to moderate 'dry' ... with slow to moderate sometimes fast streaming cut when exposed to solvent. Mud gas peaks were also recorded and, although generally not of the same scale of the increase in total gas above background as that seen in the analogue wells, one of the prospective horizons in Merlin 1 did have substantially elevated total gas, similar to that in the analogue wells," the company said.

Heavier gas components, "including C5, were observed over multiple intervals," 88 Energy said. "Resistivity was elevated over these intervals and is encouraging, particularly in the context that the Nanushuk is considered a low resistivity play type."

Fluorescence, the company said, was also "observed in the drilling mud ('pops') accompanied by a petroliferous odor over three of the target intervals."



DAVE WALL

“Significantly,” 88 Energy went on to say March 31, 2021, “one of these intervals is interpreted to be part of a potentially separate, sand package that is also present in the Harrier prospect.”

Beaten to a pulp

Less exciting news came from 88 Energy on April 6 (the news popped in Alaska on April 5 because of the time difference between Perth and Alaska.)

Dr. Paul Craig, a veteran oil and gas investor in Alaska, told Petroleum News April 6 what other experienced North Slope operatives were only willing to say off the record about that news: Although “88 Energy stock got beaten to a pulp on the news about the Merlin 1 well. I like the results, but the market doesn’t read between the lines. Short-term investors see ‘plugging the well’ and assume it’s a dry hole with no commercial potential.”

In fact, 88 Energy’s April 6 announcement said: “It is now too late in the season to initiate flow testing operations and the forward program will consist of plugging the well. The well may be re-entered in the future ... in order to drill a sidetrack and conduct a flow test.”

Kevin Frank, a geologist and section chief of Alaska’s Division of Oil and Gas resource evaluation team, agreed with Craig. In an April 7 interview with PN, Frank described the results from Opstad and his team at the well site as “encouraging.”

Frank’s reaction was similar to what ConocoPhillips said after it drilled its recent Harpoon well. The first well drilled in the prospect, Harpoon 2 was plugged and abandoned and declared a dry hole, but the company has no intention of abandoning the “promising” Harpoon prospect and expects to go back in to drill more exploration wells, possibly Harpoon 1 and 3. Merlin well results are better than those released about Harpoon 2 by ConocoPhillips.

“I think they (88 Energy) have done a good job,” Frank said, following a lengthy meeting with members of the division’s resource evaluation team. “They’ve collected well information from targets in the Nanushuk. They have reported shows, as described in their April 6 operations update, including evidence of oil in the cuttings that were brought to the surface while drilling. One of the characteristics of the oil in the cuttings is that oil fluoresces under UV light. They saw this,” Frank said.

“88 Energy conducted logging while



Merlin 1 spud crew

drilling, or LWD and were encouraged by what they saw in multiple intervals. Additional data was collected via wireline run collecting a triple combo logging suite with the addition of a nuclear magnetic resonance, NMR, tool,” he said.

The triple combo measures “gamma-ray, resistivity and density of the formation, while the NMR provides an estimate of the mobility of the fluid present. In aggregate

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this data can be interpreted to gain insight into the clay/sand content, fluid type, porosity of the rock and mobility of the fluid in the rock," Frank said.

That was 88 Energy's first run on wireline.

The second run, he said, "sounds like a downhole sampler to take fluid samples. After setting the tool, fluid is run through an optical fingerprint sensor to evaluate the fluid prior to opening the sample chamber. This allows fluids that were introduced by the drilling process to clean up prior to taking a sample that is more representative of the reservoir fluid," he said.

"They had troubles with the tool because of a power problem and so did not get a fluid sample," Frank said.

"Getting a representative sample would have been nice. Unfortunately, they were unable to get that," he said.

"After remedying the power problem, they made a second attempt but due to deteriorating hole conditions, the tool got stuck. They were able to pull the tool free," Frank continued.

"They then made the decision that it was too risky so made a decision to call it a season and come back in the future to try again after the hole has been cleaned up. Given the late point in the season it sounds like they decided to demob before their snow road deteriorated. It makes complete sense to not risk stranding equipment on the tundra," Frank said.

When asked if these situations are common, he replied, "Yes, very common on the North Slope when you've got projects working off of snow and ice roads and pads."

Operators, Frank said, try to prioritize by getting the most meaningful information first.

Did 88 Energy do that? "Yes, I would say so. They were subject to time restraints. Adjustments and contingencies are to be expected," he said, adding "you'd hate to get your data but end up stranding your rig or other equipment out there" until the next winter drilling season began — and having to pay rental rates for it the entire time.

"One point they make is that they did not get a chance to evaluate the two most prospective intervals they saw on their logs — so they have a strong impetus to ... return for farther evaluation in the future," he said.

"They found something they had not anticipated — a new prospective horizon in the Nanushuk formation that was not one of their pre-drill targets. It's always nice to find something you hadn't expected," Frank said.

Was what 88 Energy did find promising? "There is still uncertainty, but they have reduced it by getting some positive signs," he said.

"I think it is encouraging — what they did get," Frank said.

His comments were endorsed by his boss, Division of Oil and Gas Director Tom Stokes: "88 Energy has actively explored the North Slope for many years. It is encouraging to see the results they achieved during this winter's drilling activities," he told PN April 7.

Another update April 12

On April 12, 2021, 88 Energy released another Merlin 1 update and said sidewall cores from the well confirmed the presence of oil previously observed in cuttings.

"They were analyzed at surface prior to being sent to the laboratory for further testing. Photos of whole core and small chips from the core were taken in white and ultraviolet light to determine fluorescence. The rock chips were also exposed to solvent

Nanushuk ANS discoveries

Exciting Alaska North Slope discoveries in the Nanushuk formation started in 2015, when innovative explorers Armstrong Oil & Gas and Repsol E&P USA made their Pikka discovery east of the Colville Delta.

ConocoPhillips followed with its Willow discovery in 2016, and in 2017 Armstrong and Repsol successfully drilled the Horseshoe No. 1, confirming that the Nanushuk topset trend extended roughly 40 miles from Pikka.

In 2018, ConocoPhillips discovered West Willow while following up on information from its Putu and Stony Hill wells to define their Narwhal trend.

Armstrong sold its interests in Pikka to newcomer Oil Search (Alaska) LLC which followed up with its successful Mitquq and Stirrup wells in the winter drilling season of 2020.

All told, currently identified resources in the Nanushuk play appear to amount to approximately 3 billion barrels of recoverable oil.

—KAY CASHMAN

to observe any cut," the company said.

Fluorescence and cut are indicators of the presence of oil. Fluorescence and cut were observed over several horizons, confirming the observations previously reported based on cuttings. (See photos at <https://wcsecure.weblink.com.au/pdf/88E/02362329.pdf>).

88 Energy said the cores have been sent to the laboratory for further analysis.

The Reddit crowd

88 Energy is the parent of various Alaska subsidiaries such as Emerald House, which holds its NPR-A acreage, including the Peregrine project, and Accumulate, Regenerate and Captivate.

88 Energy trades as a penny stock on ASX as 88E, on AIM as 88E and on OTC as EEENF.

Until first quarter 2020, penny stocks were viewed by most investors as high risk.

But the COVID-19 pandemic triggered a flight from stocks into cash, and penny stocks became popular.

In the April 6, 2021, edition of Investor Place, contributor Robert Lakin warned that "a penny stock favorite of the Reddit trading crowd raised some questions" about 88 Energy's Merlin 1 drilling results.

"Watch for shares of 88 Energy Limited (OTCMKTS: EEENF) to tank this morning, as they follow the more-than-65% drops of the London and Sydney-listed shares of the Australian oil explorer."

"What's behind the expectations for EEENF stock today?" wrote Lakin.

"It wasn't the 'good news' part of its earlier update on its Peregrine project in Alaska ... Last week the company announced it had detected potential hydrocarbon-bearing zones while conducting drilling operations for Peregrine."

"Instead," Lakin wrote, "it's likely the 'bad news' of this morning's update from 88 Energy managing director Dave Wall."

Wall "revealed a power outage due to equipment failure and other issues," preventing the company from sampling its two

highest prospective zones. "As well, further drilling may be required to confirm a discovery," Lakin noted.

"Popular with penny stock investors," EEENF stock was "discovered" in the Reddit zone," he wrote, adding, "88 Energy has been one of the most buzzworthy Reddit penny stocks. Recent posts on the eponymous subreddit include claims that shares are 'lottery tickets' and takeover rumors."

But the most recent buzz from the Reddit crowd is less positive, he said, which appears to be part of the reason for the major sell-off of 88 Energy's shares and its plummet in price after its latest operations update on Merlin 1.

At one point the shares were at 33 cents, but more recently they were trading on ASX at 2.4 cents.

Lakin is described on Investor Place as a veteran financial writer and editor, following fintech, agtech and property tech startups. He said he did not hold any 88 Energy shares at the time he filed the article.

Much to applaud

In its April 6 update, 88 Energy pointed out that it achieved the Merlin 1 results from a "wildcat exploration well drilled on sparse 2D seismic, 60 kilometers (37.3 miles) from the nearest control well, in the middle of the Arctic winter."

The company also was pleased about finding a "new prospective horizon" in the Nanushuk formation that may all be within its Peregrine acreage and was not one of the pre-drill targets in Merlin 1.

One solid PN source said he understood the new interval might be an amazing 1,000 feet thick. No corroboration was provided by 88 Energy on April 6.

But Wall did say: "Particularly encouraging is the apparent

"Particularly encouraging is the apparent presence of oil in a zone that has not previously been targeted in NPR-A. Whilst the potential volumetric size of this zone is not yet known — as it was not a mapped target in Merlin 1 — the formation could be extensive based on initial interpretation."

presence of oil in a zone that has not previously been targeted in NPR-A. Whilst the potential volumetric size of this zone is not yet known — as it was not a mapped target in Merlin 1 — the formation could be extensive based on initial interpretation."

The "other most prospective zone with good shows and petrophysical characteristics is shared with the Harrier prospect and will likely high grade that for drilling in 2022," 88 Energy reported.

One PN source described Merlin 1 results as such: "If it walks like a duck, quacks like a duck, and swims like a duck, well...."

Umiat acquisition update

In its March 31, 2021, update, 88 Energy announced that its acquisition conditions had all been satisfied for the Umiat oil field, which is adjacent to Peregrine on the south.

"The final condition related to the acquisition of the ... oil field is now complete with cement work associated with plugging and abandoning of two historical wells at the field now executed," 88 Energy said, noting "remedial site work will be finalized in the near-term."

Umiat is an historic oil discovery made in 1945 in shallow

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Map showing location relative to Mustang Pad, Mine Site, and Tarn Road.

Brookian (Nanushuk) sandstones.

The field is covered by two leases totaling 17,633 acres that are in a unit formed in September 2019 with an initial 10-year term.

"The current conditions of the unit stipulate a well commitment (exploration or appraisal) by Aug. 31, 2022," 88 Energy said.

Eleven appraisal wells were drilled in the Umiat field by 1953, several of which were tested, the company reported: "Umiat 5 flowed 268 barrels per day on a 3-month test and Umiat 8 had a peak flow rate of 5.9 million cubic feet per day of natural gas during a 4-day test."

Little work was done until 2013-14 when Linc Energy drilled two wells, Umiat 18 and Umiat 23H. Umiat 23H was tested with a maximum flow rate of 800 barrels per day and sustained flow of 200 barrels per day, 88 Energy said.

APDC bought in

On Dec. 4, 2020, 88 Energy said it had finalized a farm-out agreement with Alaska Peregrine Development Co., or APDC, on its 100% owned Peregrine project.

APDC farmed in for a 50% ownership of the 195,000-acre Peregrine project by contributing US\$11.3 million towards the cost of the Merlin 1 well, at the time estimating gross cost of US\$12.6 million.

In the Dec. 4 announcement from 88 Energy's board of directors, APDC was identified as "a special purpose investment vehicle organized for Project Peregrine," its members "a consortium of private US entities managed by individuals that have extensive experience in oil and gas, including owning businesses that directly operate in the sector."

"Being able to secure a farm-out deal with a high caliber partner on close to two for one deal terms in the current oil and gas environment is a major coup for our shareholders," outgoing 88 Energy managing director Wall said.

"APDC is a close cultural fit for our proposed future plans for Project Peregrine. ... We look forward to potential success as we approach the imminent spud of Merlin 1," he said.

ELKO helped out

And then came a Biden Executive Order, delays and associated cost increases.

As a result, 88 Energy entered into a



Rig-111 commissioning work, January 2021

share subscription agreement with ELKO International in which Alaska-based ELKO was issued 360 million shares at a share price of 1.8 cents. The deal, announced March 21, 2021, made ELKO one of the largest shareholders in the Australian firm, per 88 Energy's website.

A well services contractor for the Merlin 1 exploration well, ELKO is 100% owned by Opstad.

"The market appears to be anticipating a win for 88 Energy ... with punters running its share price up from a close of \$0.017 yesterday to an intraday high of \$0.023 today on big volumes. Only a week ago it was trading at around a cent," Matt Birney reported March 22 in The West Australian.

"The endorsement of the project by ELKO as we enter the critical phase of the drilling is encouraging and will serve to fund the Company's share of the recently announced cost overruns," outgoing managing director Wall said in the announcement.

The Merlin 1 cost overruns were "di-

rectly related to delays associated with the Biden Executive Order regarding the issuance of the Permit to Drill for Merlin 1 costs associated with shutdown and restart whilst clarification was attained regarding the Executive Order; delays associated with cold weather and the subsequent knock on to mobilization costs as a result of expediting activities to meet the operational timetable," 88 Energy said.

Entered Alaska in 2015

88 Energy has been operating on the North Slope since 2015 having originally entered the region via an agreement in 2014 with Burgundy Xploration.

Previously, 88 Energy had been named Tangiers Petroleum, with oil and gas assets offshore Morocco and on and offshore Australia.

In November 2014, Tangiers joined forces with Burgundy, the agent and high bidder on almost 87,000 acres south of the Prudhoe Bay unit in the Division of Oil and Gas' North Slope areawide lease sale.

Tangiers became 88 Energy taking an

87.5% interest in, and operatorship of, the leases, which the partners named Project Icewine.

In the ensuing years 88 Energy expanded its Alaska exploration lease holdings to 492,000 gross, 300,000 net, acres in the central North Slope, plus the latest acquisition in July 2020 of XCD's 100% interest in the 195,000-acre Peregrine block in NPR-A, west of the central North Slope.

The company via subsidiary Accumulate also operated four exploration/appraisal wells on the North Slope in conjunction with partners — Icewine No. 1 in 2015, Icewine No. 2 in 2017, the Winx 1 well in 2019 and Charlie 1 in 2020.

None of the wells proved commercially successful, although according to 88 Energy the jury is still out on the Icewine unconventional targets in Icewine No. 2 and the condensate in Charlie 1.

Today, 88 Energy's Alaska portfolio contains three key exploration project areas — Yukon Leases, Project Icewine and Project Peregrine. The company said in its July second quarter 2020 quarterly activity report that it had relinquished its Western Block leases where it drilled the Winx well.

As of the end of 2020, 88 Energy held a total of 231,000 acres in Project Icewine.

Yukon Gold leases

In the 2017 and 2018 state areawide lease sales 88 Energy picked up eight leases on 15,234.71 contiguous acres on the eastern North Slope along the border of the ANWR 1002 area. Those leases contain a historic BP oil discovery, Yukon Gold, and are near recently commissioned infrastructure.

The 100% owned Yukon leases are operated by Alaska subsidiary Regenerate.

In its year-end 2020 report, 88 Energy said, "discussions continue with nearby resource owners to optimize the monetization strategy of the acreage, with permitting continuing for future potential exploration drilling in 2021, subject to farm-out."

88 Energy acquired 3D seismic that was shot in 2018 over the leases. The company said a 90 million barrel resource had been identified in its Yukon acreage.

Also, in its 2020 annual report, 88 Energy said "subsequent to year-end, 88 Energy, via its wholly owned subsidiary Regenerate Alaska Inc, was named high bidder on Tract 29 in the 2021 Coastal Plain (ANWR 1002 area) Lease Sale. Tract 29 is comprised of 23,446 acres and is adjacent to 88 Energy's existing Yukon Leases as well as the Point Thomson gas condensate field, which is currently in production. The acquisition of these leases represents a logical step in the Company's aggregation strategy for oil resources in this part of the North Slope, where existing infrastructure provides a potential pathway to commercialization."

Close to Yukon Gold

A few miles north and a little east of Yukon Gold and the eight 88 Energy leases, Jade Energy owns and operates the untapped Sourdough prospect and is planning to drill a new Sourdough oil well in the winter of 2022 or 2023, under an agreement with Point Thomson operator ExxonMobil.

The well, on state lease ADL 343112 in area F, Tract 32, of the Point Thomson unit, will be drilled to approximately 12,750 feet to encounter a prospective Brookian sand target and Hue shale.

As part of the 2012 settlement between the State of Alaska and the working interest owners of the ExxonMobil Point Thomson unit, an East Pad was to be built, an East Pad well drilled and an additional well drilled in the unit.

The state has since agreed that the requirement will be fulfilled

through independent Jade Energy's plans for Sourdough, which will utilize some existing Point Thomson infrastructure for its operations.

ADL 343112 holds two mid-1990s Sourdough oil discovery wells that were drilled by BP, which estimated Sourdough held 100 million barrels of recoverable oil.

ExxonMobil and the other major working interest owner at the time assigned their full working interests in Tract 32 of the lease to Jade, each retaining a small overriding royalty. The deal gave all three North Slope producers some skin in the game, fully aligning them in delivering a successful Sourdough development.

By building a 70,000 barrel per day liquids export pipeline at Point Thomson that connects to the Badami unit and thus moves oil and condensate to Pump Station 1 of the 800-mile trans Alaska oil pipeline, ExxonMobil improved the development economics of other oil prospects to the east, such as Sourdough and Yukon Gold.

Jade's owners are Anchorage-based Opstad and Castle Rock, Colorado-based Greg Vigil, who each own 50% of the firm, with Opstad in charge of management.

Project Icewine, conventional

In 2019, 88 Energy signed a sale and purchase agreement with London-based Premier Oil Plc under which Premier farmed-in for a 60% interest in Area A of the conventional Project Icewine acreage, with 88 Energy retaining a 30% working interest in Area A and the remaining 10% working interest held by Burgundy.

Under the terms of the agreement, Premier paid the full costs of the appraisal well, Charlie 1, up to a total of \$23 million to test the reservoir deliverability of the nearby 1991 Malguk 1 BP oil discovery.

The well came in under budget, but the results were not commercial, and the well was plugged and abandoned in April 2020.

Project Icewine, unconventional

Unconventional detailed logs and sidewall cores were also acquired in the HRZ formation in Project Icewine.

The HRZ "remains a viable target and options to commercialize this potentially large resource continue to be pursued," 88 Energy said in its second quarter 2020 activity report.

The company plans to conduct a formal farm-out process to fund further appraisal.

Enthusiastic about Alaska

In his March 9, 2021, chairman's letter, Evans praised Alaska's North Slope, saying its source rocks "have been described as unbelievably rich and prolific, having generated and expelled about 1.5 trillion barrels of oil. Yet only a small fraction of that 1.5 trillion barrels has been found, leaving vast potential remaining to be discovered."

"Access to existing infrastructure, a very supportive and stable state government and significant exploration upside," are three of the things 88 Energy likes about the state, Evans said, noting 88 Energy operates 444,517 net acres on the North Slope.

"Our prospective land holding is now of a size one would normally associate with the big end of town and provides continued scope to attract partners," he said. ●

*Contact Kay Cashman
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ConocoPhillips: 'hitting reset' in 2021

Alaska's most consistent explorer resumes activities at several projects

By **ERIC LIDJI**
For Petroleum News

ConocoPhillips Alaska Inc. is the most prolific North Slope explorer of the 21st century.

As many of its large multinational contemporaries were retreating from exploration to focus on development, ConocoPhillips continued to pursue opportunities beyond its existing North Slope units. And although many smaller independents occasionally outdid ConocoPhillips in any given exploration season, they have all lacked ConocoPhillips' longevity, either leaving after a few seasons or selling prospects after de-risking them.

In the 19 years since the 2002 merger that created ConocoPhillips, the Alaska unit of the Houston-based multinational exploration and production company has diligently pushed westward beyond the Kuparuk River unit. Its exploration activity has now expanded the reach of North Slope oil development



RYAN LANCE

ConocoPhillips



COMPANY HEADQUARTERS:

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TOP ALASKA EXECUTIVE: Ryan Lance

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beyond the Colville River and into federal lands.

But for a company defined by its constancy and consistency, the past few years have been unpredictable. Some seasons were among ConocoPhillips' most active ever. Others saw no exploration at all. Others started out strong but then were unexpectedly

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Navigating Path to Development

- Two lawsuits pending
- Preliminary injunction halted 2021 winter gravel work
- Advocating to new administration to support project based on extensive NEPA analysis/admin record and stakeholder support
- Continuing to advance FEED
- Potential impacts on schedule to be determined

CONOCOPHILLIPS *continued from page 19*

cut short.

ConocoPhillips conducted no exploration activities this year, following two robust winters. In the winter season of 2018-19, the company completed nine wells listed as “exploratory” by the Alaska Oil and Gas Conservation Commission. The list included one well in the Kuparuk River unit and two wells within the Colville River unit, in addition to six traditional exploration wells in the National Petroleum Reserve-Alaska.

The company planned a seven-well exploration program for 2020 but only completed three before reducing its activities in response to the emerging coronavirus pandemic.

This year, the company delayed its decision to restart drilling activity pending the results of the Nov. 3 ballot initiative to increase oil production taxes in the state. Following the defeat of



EREC ISAACSON

the ballot measure, and then the stabilization of oil prices around \$40 per barrel, ConocoPhillips announced plans to resume drilling before the end of 2020.

The announcement covered a range of development and maintenance projects at the Kuparuk River unit, the Colville River unit and the Greater Mooses Tooth unit. But it did not include any exploration drilling for the 2020-21 season, making this year one of only a handful of exploration seasons over the past 20 years without ConocoPhillips.

The starts and stops of the past few years can make it easy to overlook the larger trend: ConocoPhillips has been undertaking a notable expansion of its exploration activities. In addition to its long-standing movement to the west, it has also been pursuing emerging opportunities closer to its existing units at the western edge of the central North Slope.

In a presentation at Meet Alaska in late March 2021, ConocoPhillips Alaska President Erec Isaacson described 2021 as “hitting reset.” The company would focus on lowering costs and engaging stakeholders and would also resume regular development drilling, as well as progress on \$1.1 billion in projects across the North Slope: Greater Mooses Tooth No. 2 construction, Alpine expansion, Willow permitting, Nuna development and ongoing work at the Eastern NEWS (North East West Sak) at the Kuparuk River unit.

Heading west

ConocoPhillips is best known for its gradual westward expansion on the North Slope.

Through its predecessor companies, ConocoPhillips helped discover or develop the Kuparuk River unit, as well as the Alpine field and its satellites at the Colville River unit.

After the National Petroleum Reserve-Alaska was reopened for exploration in 1999, ConocoPhillips’ predecessor Phillips Petroleum Co. was one of the first companies to explore the region.



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In May 2001, Phillips announced three major NPR-A discoveries.

“These discoveries mark an important milestone in the Alaska oil industry,” then-president of Phillips Alaska Kevin Meyers said at the time. “Though the results are preliminary, we’re confident the discoveries will prove to be of commercial quantities.”

Anyone who follows the announcements of oil and gas companies knows to be mindful of hyperbole, but ConocoPhillips has long since justified those comments. The company has spent the last 20 years pursuing the NPR-A discoveries announced by its predecessor in May 2001, and it is only recently seeing oil production from the first of those properties.

The current push dates to 2008. That year, ConocoPhillips formed the Greater Mooses Tooth unit around the cluster of NPR-A wells and discoveries west of Nuiqsut. The move helped protect soon-to-be-expiring leases dating back to the original 1999 lease sale.

ConocoPhillips also relinquished 19 federal tracts around Intrepid 2 well south of Barrow, a sign that it was losing interest in wildcat exploration on the North Slope.

Between 2008 and 2016, ConocoPhillips gradually backed away from Alaska offshore exploration, too. The company dropped most of its Beaufort Sea leases in 2009 and spent several years pursuing Chukchi Sea opportunities before dropping those leases in 2016.

At the same time, ConocoPhillips was increasingly focusing its energies on exploration opportunities within close reach of its existing onshore infrastructure. Toward the end of 2015, ConocoPhillips CEO Ryan Lance announced, “Over the past couple of years, we’ve been able to change the profile of our Alaska business. We’ve transformed the declining production base into one that can deliver stable production for a decade.”

The U.S. Bureau of Land Management approved the formation of the Greater Mooses Tooth unit in 2008. ConocoPhillips expanded on its May 2001 discoveries in the unit area with a series of related exploration wells, including the Pioneer No. 1 and Grandview No. 1 wells in early 2009 and the Rendezvous No. 3 and Flat Top No. 1 wells in early 2014.

Through subsequent exploration, appraisal and development work, ConocoPhillips unofficially divided Greater Mooses Tooth into three regions: east, central and west.

ConocoPhillips began producing the eastern leases in October 2018, when it brought the GMT-1 pad online. The company is currently in the final stages of development work on the GMT-2 pad, which will develop the leases in the southcentral portion of the unit.

The company employed as many as 700 people on the GMT-2 project this winter, which was the third and final year of construction on the \$1.4 billion project. Development drilling on the first of 36 wells was scheduled to begin in the second quarter with first oil by the end of the year. GMT-2 should produce 35,000 to 40,000 barrels per day at its peak.

Willow

Exploration activity in recent years has focused on the western leases. Those leases are now associated with the Bear Tooth unit, which is adjacent to Greater Mooses Tooth.

ConocoPhillips began staking its first Tinmiaq wells in late 2015 and completed a two-well drilling program in the area in early 2016. The work was notable for pushing beyond previous drilling activity in the region. Way back in May 2001, when Phillips Alaska Inc. announced its initial oil discoveries in the area, the exploration activity was clustered in what would later

become the center of the Greater Mooses Tooth unit. Subsequent exploration activity pushed to the south and the east — but not into the western leases.

The initial Tinmiaq exploration program came as ConocoPhillips was sanctioning its initial \$900 million GMT-1 development at the eastern end of Greater Mooses Tooth and permitting its GMT-2 development on leases in the south-central section of the unit.

In early 2017, ConocoPhillips announced that the first Tinmiaq wells — Tinmiaq No. 2 and Tinmiaq No. 6 — had made a major discovery in the Nanushuk formation. The Willow prospect was estimated to contain as much as 300 million barrels of recoverable oil and could potentially produce as much as 100,000 barrels per day at its peak.

“This discovery is tremendously exciting not only for ConocoPhillips, but also for the state of Alaska,” then-ConocoPhillips Alaska President Joe Marushack said. “Willow’s proximity to existing infrastructure improves the economic viability of the discovery. Development of Willow, a potential multi-billion-dollar investment, could provide thousands of jobs during construction and could generate substantial revenue for the federal government, state, North Slope Borough, and communities in the NPR-A.”

In addition to being encouraged by resource estimates, ConocoPhillips was intrigued by Willow’s geology. Willow was one of three major North Slope oil discoveries made within a year in the Nanushuk formation or in the closely associated Torok formation — following Armstrong Energy’s Pikka and Caelus Energy’s Tulimaniq discoveries.

In late 2016, after drilling the two Tinmiaq wells but before

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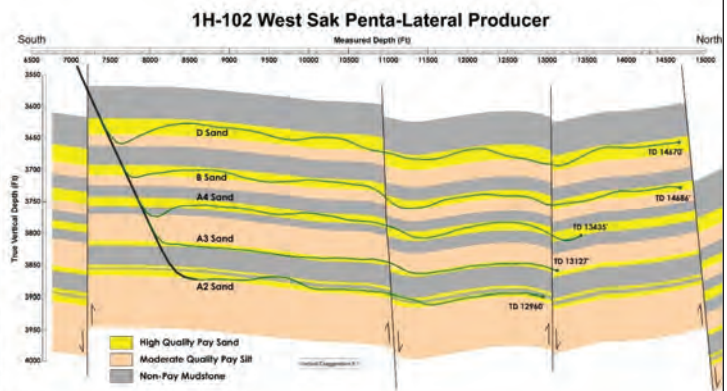
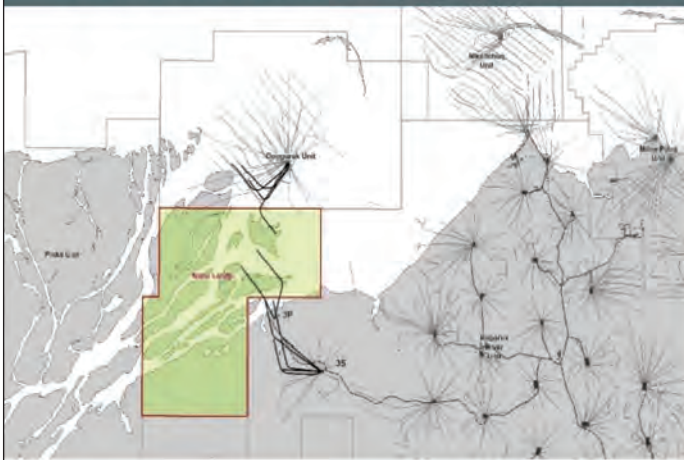
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Nuna and Eastern NEWS



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Nuna

- Planning to process through Kuparuk facilities utilizing existing drill sites
- ~400 winter construction jobs over a single winter construction season
- Acquired in 2019, first oil planned for mid-2020s

Eastern NEWS

- Continuing success of 1H NEWS 2017 drill site
- Expansion of viscous oil production
- Will use coiled rig to drill multi-lateral wells

Low-risk, low-cost development of discovered resource, leveraging existing infrastructure.

CONOCOPHILLIPS *continued from page 21*

announcing the discovery, ConocoPhillips 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. And in 2017, after announcing the discovery, ConocoPhillips commissioned a 3D seismic survey over the region.

That may seem like a rush of activity, but subsequent permitting documents suggested that ConocoPhillips had discovered the Willow prospect in 2002 with its Hunter A well.

ConocoPhillips returned with a four-well program in 2018 (Tinmiaq No. 7, No. 8 and No. 9 and West Willow No. 1) and a five-well program in 2019 (Tinmiaq No. 10, No. 11, No. 13, No. 15 and No. 16, along with re-entry projects on Tinmiaq No. 2 and Tinmiaq No. 9). The company planned a six-well program in 2020 but was only able to complete two wells (Tinmiaq No. 18 and No. 20) before coronavirus restrictions interceded.

One of the big questions hanging over the Willow prospect from the beginning was whether ConocoPhillips would develop it independently or as an Alpine satellite. The decision would impact the cost and design of the project, as well as its production rate.

A satellite would produce about 40% to 50% of the peak production of a standalone field, and it would be timed to accommodate the existing Alpine facilities. Production would be drawn out across a longer timeline. But a satellite would be the cheaper option.

In a proposed development plan filed with the U.S. Bureau of Land Management in early 2018, ConocoPhillips endorsed a standalone facility. “The existing processing facility at Alpine is not feasible for a tie-in of the Willow development due to geographic and technical constraints,” the company wrote. “The Willow master development plan would require construction of a new processing facility, the Willow Central Facility.”

The proposal did, however, envision using existing pipeline systems to bring seawater and diesel fuel to the proposed field

and to deliver sales-quality crude from the field.

The Willow project was delayed earlier this year when the U.S. Court of Appeals for the 9th Circuit extended an injunction, banning ConocoPhillips from conducting fieldwork for its Willow oilfield development. The injunction emerged from a lawsuit by Sovereign Inupiat for a Living Arctic and several environmental organizations against the Bureau of Land Management. The case was still pending as *The Explorers* was going to print.

Harpoon

As work advanced on the Willow prospect, ConocoPhillips again stepped westward.

The company’s initial plans for the 2019-20 winter exploration season included exploration drilling at the Harpoon prospect, southwest of Willow. Before the program began, Executive Vice President of Exploration and Production Matt Fox said that seismic work had identified an anomaly worth investigating. It “looks like there could be ... quite substantial resources,” he said. “Now it could be gas and it could be water. It’s almost certainly a reservoir, because we’re pretty sure that’s what the seismic signature’s telling us ... but it doesn’t have to be huge for it to be a tieback to the Willow hub.”

The season was supposed to be among the largest ever for ConocoPhillips. In addition to the six Tinmiaq wells, the company planned four “rank exploration” wells at Harpoon.

ConocoPhillips hadn’t intended to complete all 10 wells, only to provide options for a seven-well program. But global circumstances made even that smaller goal impossible.

Just as the exploration season was gathering momentum, the coronavirus pandemic was suspending operations around the world, including the distant and isolated North Slope.

By the time ConocoPhillips demobilized its fleet in early April in response to the pandemic, the company had only completed one of the Harpoon wells — Harpoon No. 2.

A further disappointment came earlier this year. In its annual U.S. Security and Exchange Commission filings, ConocoPhillips

announced that Harpoon No. 2 had been a dry hole. According to the company, "evaluations confirmed the well intersected sub-commercial volumes of hydrocarbons in the upper Harpoon interval which will not be developed."

In an earnings call in early 2020, Fox said Harpoon 2 appeared to have "clipped the edge of the topset based on its log response," adding that the company wouldn't know for sure until it drilled a second well. Asked by analysts whether the well had encountered hydrocarbons, Fox acknowledged that it had. "It looks from a lithological perspective similar to other lithological signatures we're seeing on the edge of these topsets," he said.

Even so, the company said it still believed in the potential of the "Harpoon Complex," described as Harpoon, Lower Harpoon and West Harpoon, and intended to return to it.

Narwhal

The 2018 exploration program to appraise the Willow discovery also included a pair of exploration wells just south of the Colville River unit, near the village of Nuiqsut.

The play has a long and circular history with many names.

ConocoPhillips first asked the state to expand the Colville River unit to include acreage to the south in 2002, around the time of its merger. The prospect was known at the time as Titania. The state agreed to the Titania expansion but eventually contracted the acreage out of the unit in 2004 after ConocoPhillips had failed to meet its drilling commitments.

A joint venture operated by Brooks Range Petroleum Corp. subsequently acquired the acreage through a lease sale and began referring to the leases as the Tofkat prospect. The small independent encountered hydrocarbons on the leases in early 2008 with the Tofkat No. 1 well and two related 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. ConocoPhillips asked the state to incorporate it into the Colville River unit.

The state was hesitant to approve the expansion, because of the atypical status of the leases and because of ConocoPhillips' previous failure to explore the acreage. But state officials ultimately agreed to the request, pursuant to bonds, guarantees and conditions.

Under this newest effort, ConocoPhillips began referring to the project as Putu. To meet the initial set of conditions required by the state, ConocoPhillips drilled the Putu No. 2 and Putu No. 2A wells and made a \$3 million bonus bid replacement. The company also drilled four appraisal wells — CD4-595PH1, CD4-595, CD4-594PH1 and CD4-594 — beyond its work commitments "to better understand the reservoir and to test the technical feasibility of extended reach drilling at shallow depth," according to the company.

The next round of commitments required ConocoPhillips to pay \$4 million to the state and submit a plan detailing efforts to bring the leases into sustained production.

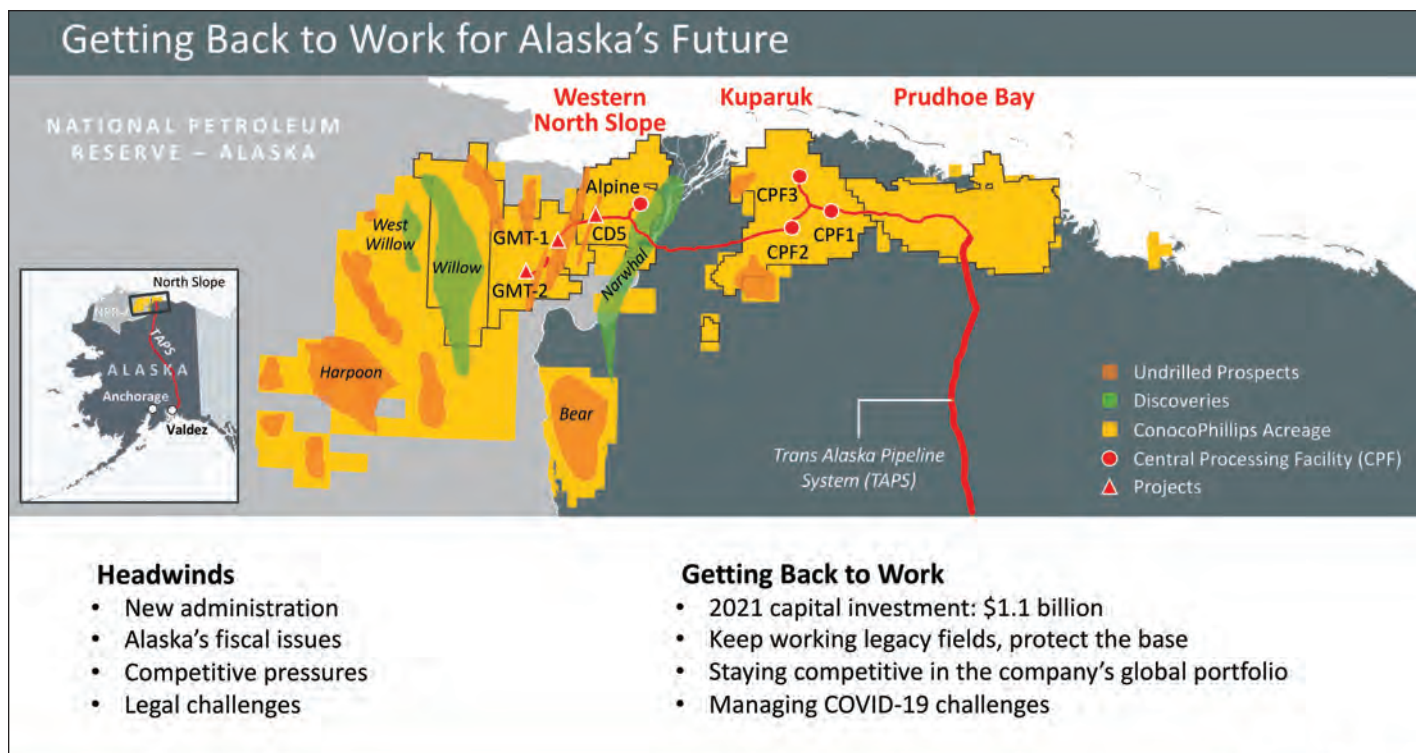
Based on preliminary testing of its initial Putu exploration wells, the company announced the Narwhal discovery, estimated to contain between 100 million and 350 million barrels of oil equivalent. Like Willow, Narwhal was also in the Nanushuk formation. Willow and Narwhal are different sediment deposits within the formation, with Willow being older.

ConocoPhillips drilled a follow-up well at Narwhal in the

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CONOCOPHILLIPS *continued from page 23*

2019 exploration season. That summer, the company said that the results were “encouraging” enough to justify “an additional unbudgeted horizontal well from an existing Alpine drill site into the Narwhal trend” later in the year. That relatively spontaneous decision, at least by North Slope standards, reflects one of the big strategic opportunities of the prospect. It is close enough to the Colville River unit to utilize existing well pads, bringing down costs and reducing some of the most common logistical complications of off-road winter exploration.

Asked about the additional well, Fox said it would be a “long-term test” to better “understand the long-term deliverability.” He added, “We also can drill an offset injection well to this producer from the same drill site. So, we’re going to take the opportunity to do that as well. And that will give us further information on the Narwhal trend. But it’s really driven by encouragement and what we saw in the initial well in the Narwhal, the Putu appraisal well we call that. We’re feeling good about that.”

A long-term flow test conducted on the Narwhal exploration well also “exceeded expectations,” according to ConocoPhillips. The well produced at a peak rate of 4,500 barrels of oil per day, leading the company to increase its estimated ultimate recovery figure for the prospect by 150 million to 400 million barrels of oil equivalent.

The company initially envisioned a two-pronged strategy at the Narwhal prospect. It would drill about half the wells horizontally from the existing CD-4 pad at the Colville River unit and the remaining wells from a new CD-8 pad in the southern end of the unit.

Under that proposal, the company initially expected production as early as 2022 from the wells at the CD-4 pad and production from the planned CD-8 pad as early as 2025.

But by late 2020, the company was rethinking its approach. The CD4-594 and CD4-595 appraisal wells had “stretched the limits” of serviceable extended reach drilling at shallow depths,

according to ConocoPhillips. And so the company shifted the project toward CD-8, which would support between 20 and 40 wells, depending on modeling.

Stony Hill

As part of the 2018 program to appraisal Putu, ConocoPhillips also explored the Stony Hill prospect, located in the NPR-A about six miles south of the village of Nuiqsut. The well and sidetrack were west of the Armstrong Energy Inc. wildcat Horse-shoe No. 1 well.

ConocoPhillips described Stony Hill as a prospect similar to Willow and estimated that it contained at least 300 million barrels of recoverable oil in the Nanushuk formation. 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.”

The Stony Hill wells encountered oil but required additional appraisal drilling and analysis — as did the Putu wells, which are closer to Colville River unit infrastructure.

All the ConocoPhillips projects at the Colville River unit and in the NPR-A place additional responsibilities on the Alpine infrastructure. In his Meet Alaska presentation, Isaacson described three projects underway this year to expand the gas-handling capacity and power generation and to add a slug catcher at the Alpine processing facility. The \$190 million projects would allow Alpine to handle additional production coming online.

Nuna

Just as the Narwhal project has been extending the reach of the Colville River unit to the south, the Nuna project is extending the reach of the Kuparuk River unit to the north.

For years, the Nuna prospect was seen as crucial to the future of the Oooguruk unit, located in the waters of Harrison Bay northwest of the Kuparuk River unit. Companies in the region

had known about the prospect for years. The Nuna field is located in the shallow Torak formation, and all drilling into deeper reservoirs had passed through it.

Pioneer Natural Resources Alaska Inc. officially discovered the prospect during the 2013 winter exploration season with its Nuna No. 2 well. With the results that well, the independent increased both the aerial extent and the estimated ultimate recovery of the field — claiming it could contain between 75 million and 100 million barrels of recoverable oil, resulting in some 25,000 barrels of oil per day over 25 to 30 years.

The next operator of Oooguruk, Caelus Natural Resources Alaska Inc., sanctioned a \$1.4 billion Nuna development — with \$550 million for construction and the remainder for drilling — in 2015 and even received a major royalty modification from the state to make the project work. It paused work a few years over concerns about the economic climate.

Caelus ultimately left Alaska in early 2019, selling off its properties. While the company sold the Oooguruk development to its minority partner Eni, and later announced that it had sold 100% ownership in the Nuna leases to its neighbor ConocoPhillips.

The sale made sense considering that the company had intended to access the offshore Nuna leases using an onshore development at Oliktok Point, in the Kuparuk River unit.

ConocoPhillips had already been testing wells in the Torok since at least 2013. Speaking about the project during an earnings call in July 2019, ConocoPhillips executive Michael Hatfield said that the Nuna prospect could be developed mostly from existing pads and roads and that the remaining facilities could be built in a single ice road season. He estimated that the field could be developed with oil prices in the low \$30 per barrel range and that the field would produce about 100 million barrels on \$100 million investment.

At that time — nine months before the pandemic — ConocoPhillips was planning a few years of appraisal as part of its Kuparuk River program, leading to first oil in 2022. In his Meet Alaska presentation, Isaacson put the timeline for first oil at the “mid-2020s.”

Nuna production would be processed through Kuparuk River unit facilities, as would additional production from the NEWS project. Although not traditional exploration, the expansion of viscous oil

production from the 1H NEWS drill site is a source of new oil.

Legacy

ConocoPhillips’ work west of Prudhoe Bay has influenced regional exploration.

Incremental advancement is a defining feature of the North Slope. The basin contains many known oil fields that would instantly be standalone commercial properties if they existed in a less remote corner of the world. The challenge on the North Slope over the past 60 years has been building up regional infrastructure to create economies of scale.

By developing the Kuparuk River unit and then the Colville River unit, ConocoPhillips changed the characteristics of the swath of land between those two oil fields. The so-called “billion-dollar fairway” has perpetually interested smaller exploration companies.

There are currently three units in the region: the Oil Search-operated Pikka unit, the Arctic Slope Regional Corp.-operated Placer unit and the Mustang Holding LLC-operated Southern Miluveach unit, which was the first to move into development.

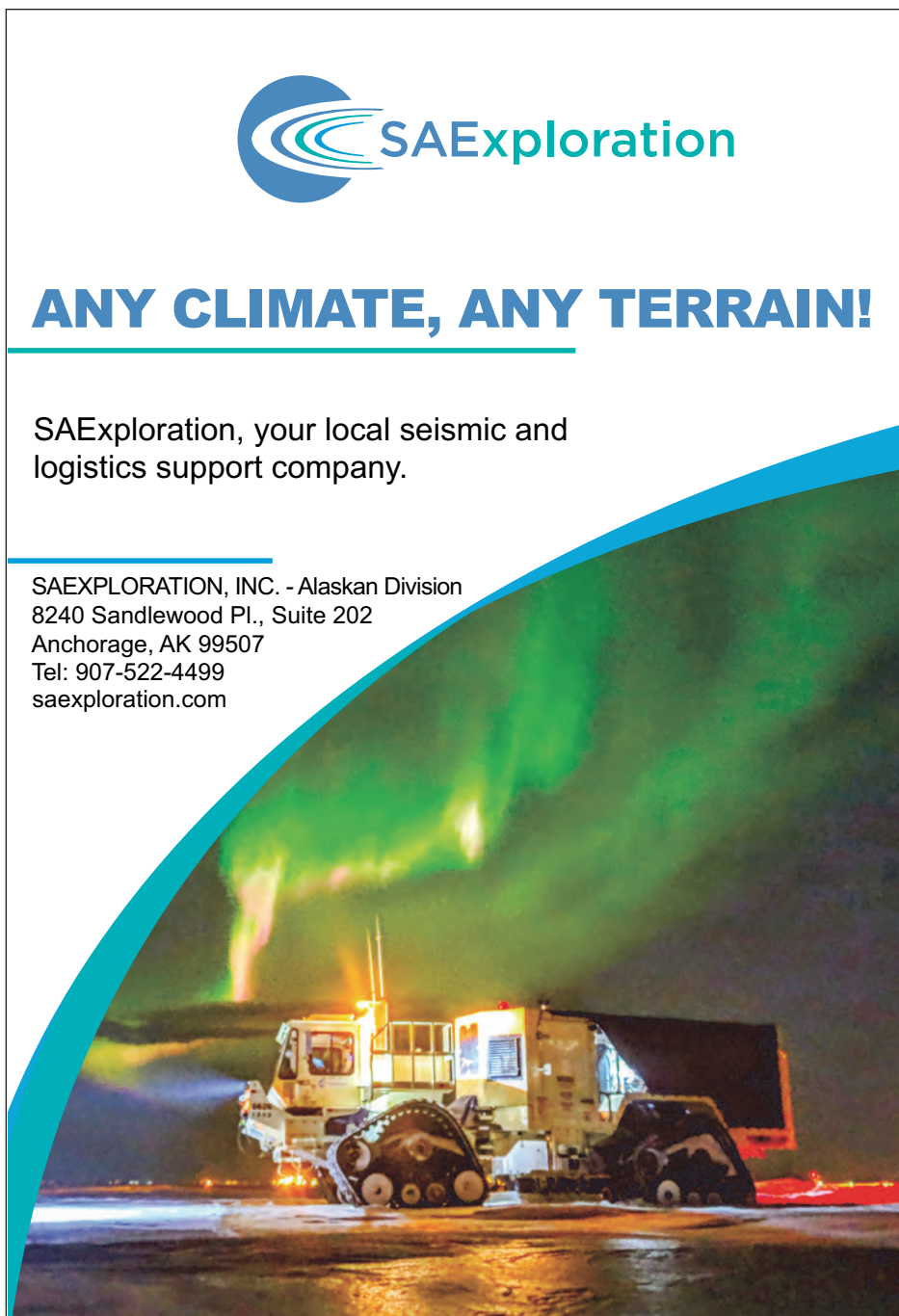
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CONOCOPHILLIPS *continued from page 25*

Pikka, Placer and Southern Miluveach all, in some fashion, rely upon the infrastructure of the Conoco-Phillips' operated units, usually in the form of various pipeline capacity.

These partnerships are not perfect. In some cases, smaller players have chosen to pursue standalone production facilities, rather than attempt to find space with ConocoPhillips facilities.

Building standalone facilities greatly alters the economics of a project. A company would only assume the expense voluntarily if self-sufficiency provided an equivalent benefit.

But, by comparison, the lands east of Prudhoe Bay are much less crowded.

Geology is partially responsible for that imbalance. The Point Thompson unit and the neighboring Badami unit have both proven to be exceptionally challenging puzzles.

But history matters, too.

Point Thompson came online much later than the Kuparuk River unit. And whereas the Kuparuk River unit sits immediately adjacent to Prudhoe Bay, Point Thompson is some 30 miles away, creating a much larger area to traverse through that incremental advancement. The reopening of the NPR-A in 1999 created incentives to the west, while the political complications at the Arctic National Wildlife Refuge over the same time created disincentives to the east.

One can imagine an alternate history: if ANWR had been open for development, if Point Thompson had been closer to Prudhoe Bay, if geology had been more accommodating, perhaps there would also be a billion-dollar fairway to the east instead of the west. ●

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Looking for natural gas, not oil in Alaska

New player Gardes signs contract with Enstar to continue distributing North Fork gas; works 3D to generate own ideas for southern Kenai Peninsula unit

By **KAY CASHMAN**
Petroleum News

Bob Gardes of Lafayette, Louisiana, entered Alaska in September 2020 with the three-fold purpose of becoming a natural gas producer by acquiring bypassed and/or underdeveloped gas deposits in the Cook Inlet basin, securing offtake commitments to sell gas to Alaska utilities and large industrial end users on a long-term basis and developing, building and operating gas and power infrastructure that supports the use of the clean burning fuel.

Gardes Holdings' website further indicates that compressed natural gas, or CNG, and liquefied natural gas, LNG, also play a part in the company's plans for Alaska.

Gardes purchased the southern Kenai Peninsula North Fork unit in September 2020 from Cook Inlet Energy, or CIE, a Glacier Oil and Gas company. The 2,600-acre unit produces from a single participating area covering 800 acres.

While Gardes, per its website, is "currently negotiating" additional "potential acquisitions in the Cook Inlet region," its operations crew on the ground, led by Mark Landt, has its attention focused on enhancing production from the company's first natural gas acquisition — the North Fork unit.

North Fork was first brought online in 2011 by a Bill Armstrong joint venture, even though the field was first unitized by Standard Oil Co. of California in 1965. In February 2021 Vision Resources, a Gardes operating subsidiary, entered into a five-year natural gas sales and purchase contract with Alaska Pipeline Co. that will result in APC's utility affiliate Enstar Natural Gas continuing to distribute gas from North Fork after CIE's contract expires on May 10, 2021. (In a nearly \$65 million deal Armstrong sold the small gas field to CIE's original parent in 2014. At the time Anchorage-based CIE was a subsidiary of publicly traded Miller Energy Resources Inc. of Tennessee.)

What's next

"For the next year or more" Vision is "focused on North Fork," Landt, vice president of land and upstream business development for Gardes, told Petroleum News on March 10, 2021. "We see some definite opportunities to pursue there," he said, noting the



BOB GARDES



MARK LANDT

Gardes Holdings, Inc.



NAME OF COMPANY: Vision Operating, LLC
(Gardes Holdings, Inc. parent company)
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TOP ALASKA EXECUTIVE: Mark Landt, VP, Land & Business
Development
TELEPHONE: 214-738-6945

company has a "full G&G staff" working on North Fork.

"Now that we have our plan of development for the unit approved with the Division of Oil and Gas and have purchased 3D

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GARDES *continued from page 27*

seismic ... we are going to be working the 3D data and generating our own ideas going forward.”

Landt said Vision sees “additional gas to be recovered” at North Fork, mentioning the possibility of “additional sands” in the field and more workovers.

The plan of development approved by the Alaska Department of Natural Resources’ Division of Oil and Gas was the 56th POD for North Fork.

Gardes is waiting on more decisions from the division.

The first was approved in mid-March 2021 and that was to delay for one year a unit contraction; requested on behalf of Gardes by operator CIE because it would allow the new owner time to assess opportunities for additional drilling targets outside the participating area and other methods of enhanced production from the unit.

Contraction of a unit is required after a unit has been in production for 10 years, at which point it is contracted to areas that are producing.

With North Fork having only one 800-acre PA, the contraction was a logical step; until Gardes came into the picture, that is.

The other two requests are to assign interest in the North Fork leases and unit operatorship to Gardes. As of April 9, 2021, both requests, which were made in November, were still under review.

Through the end of 2020, North Fork had cumulative production of 21.46 billion cubic feet of natural gas and 27,414 barrels of water, all from the original participating area.

Deal with Enstar

APC’s Enstar contract with CIE to distribute gas from North

Landt said Vision sees “additional gas to be recovered” at North Fork, mentioning the possibility of “additional sands” in the field and more workovers.

Fork expires on May 10.

Gardes’ contract goes into effect the next day, at a starting price of \$7.30 per thousand cubic feet. After the first year the gas price will increase annually by 7 cents per mcf through the end of the contract for a final price of \$7.60 per mcf.

North Fork gas production averaged 3,037 mcf per day in February 2021, down 18.3% from a February 2020 average of 3,715 mcf per day.

Work in the unit

The North Fork unit currently includes five state leases, encompassing a total of 2,601.84 acres, the division said.

North Fork’s single PA, Gas Pool No. 1, was established in 1965 on 640 acres. In 2011, the same year in which the Armstrong venture achieved sustained production, the PA was expanded to 800 acres.

The division said CIE completed some of the work proposed in its 55th POD. The company added perforations to one of the wells in the field, and although the COVID-19 pandemic forced suspension of that work, CIE did accomplish modification of compression capabilities “to assist in extending the life of the wells” and used offsite disposal to assist in controlling water production, as well as identifying equipment and resources necessary to decrease system pressure at the facility.

For the 56th POD, CIE offered “no specific plans for exploration or delineation,” the division said, but said the operator will continue to evaluate opportunities to drill outside the existing PA, as well as analyze and optimize current production from the unit.

As with the 55th POD, in its 56th plan the company said, “additional drilling will depend on favorable economic conditions.”

When the division approved the 56th POD, it said the plan protects the public interest “by maintaining and optimizing current production while evaluating future drilling opportunities.”

Mark Landt returns

Gardes is awaiting lease assignments applied for in November 2020 from the division. Once it has those in hand, Landt said, the firm will assign the leasehold to Vision Resources, one of two companies Gardes Holdings formed in Alaska. The other is Vision Operating, which will operate the North Fork unit.

Landt, who is well known in Alaska’s oil patch, began his career with ARCO where he spent 25 years in various land, negotiations, acquisition, business development, marketing and senior management positions in their Denver, Lafayette, Dallas, Houston, Anchorage, Bakersfield and Plano (International) offices.

He has more than 25 years of direct experience in Alaska and was based in Anchorage for five years.

After leaving the company, Landt co-founded Prodigy Alaska, Renaissance Alaska, Buccaneer Alaska and Stellar Oil & Gas, all focused on E&P in Alaska.

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Landt has previously worked with Stephen Hennigan, vice president of engineering for Gardes Holdings.

Per the company's website Hennigan is the lead on engineering, drilling and completions in Alaska.

He has a "40-year track record of success in the oil and gas industry throughout the Lower 48 and, importantly, the Cook Inlet of Alaska. Steve has been directly engaged in successful drilling and development of North Fork unit and other Cook Inlet fields since 2007, for previous operators and owners," having "institutional knowledge of North Fork," gardesholdings.com reported.

Major gas province

Bob Gardes views the Cook Inlet basin as one of four top gas regions in the world.

Gardes' website said he has "over 40 years engineering, drilling, completions in the oil and gas industry" and is "a pioneer in lateral drilling and completions and coalbed methane development world-wide with more than 3,000 wells drilled under his management and supervision."

Bob Gardes' companies own "multiple drilling patented methodologies related to lateral drilling and completions."

He views natural gas as the "fuel of the future," the website said.

"We hope to be gold star presence among oil and gas companies in Cook Inlet," Gardes told Petroleum News in early November 2020. (Landt said the company will not thumb its nose at an oil discovery, but gas is most important to it.)

"We hope to be gold star presence among oil and gas companies in Cook Inlet," Gardes told Petroleum News in early November 2020.

"For the last 20 years we've been coming to Alaska. ... There is a lot of bypassed gas here because the deposits weren't big enough" for the companies to bother with them.

"We think the future in the U.S. is gas. It burns 98% cleaner than oil and coal. It is a transformational resource," Gardes said. ●

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Hilcorp flips the script

The company has used its development knowledge to become an explorer

By **ERIC LIDJI**
For Petroleum News

Hilcorp Alaska LLC often blurs the line between exploration and development.

The company is best known for reviving aging oil and gas fields. But that doesn't mean it has been content to work exclusively within the boundaries of its existing properties.

Over the past 10 years, the Alaska unit of the large privately held Texas-based independent has increasingly pursued opportunities beyond its existing developments.

Sometimes this work has investigated promising prospects long-since abandoned by previous operators. Sometimes Hilcorp has followed-up on its own theories and ideas.

Hilcorp initially looked just beyond its units, but it is increasingly sniffing further afield.

Over the past 25 years, many new companies have come to Alaska with an urge to explore. The lucky ones make a discovery, and the diligent ones shifted to development.

In some sense, Hilcorp moved in the opposite direction.

It spent years studying the underlying geology of Alaska through development work, and then it applied that knowledge to its holdings to seek out possible exploration prospects.

Case in point: its study of drainage anomalies.

Through its initial acquisition of Alaska properties, Hilcorp became the operator of the legacy Swanson River oil field. Soldotna Creek circles an important producing section of the field. "It's hard to avoid seeing the importance of drainage anomalies when you see this," Hilcorp Senior Geologist Dave Buthman said. "A full half of the production of Swanson River has come from this circular drainage anomaly." The company found similar anomalies where Deep Creek flows at the Happy Valley field and around the Anchor River at the new Seaview field.

It can sometimes be difficult to determine which Hilcorp's projects are exploration and which are development. Only eight of the 767 Alaska Oil and Gas Conservation Commission drilling permits issued to Hilcorp have been listed as "exploratory" by the agency, with another 28 listed as "stratigraphic test" and one listed as "unclassified."

But when you look at the activity on the ground, a lot of the projects Hilcorp has undertaken in Alaska have the spirit of exploration: searching, without any guarantees.

To date, these exploration-like projects have generally been in the Cook Inlet, where Hilcorp started its Alaska career. But the company is also sniffing around exploration opportunities on the North Slope, including one of the big legacy projects in the basin.

Ninilchik

The earliest foray into exploration came in 2013 and 2014, just a few years after Hilcorp arrived in Alaska through its purchase



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of Unocal's and Marathon's Cook Inlet portfolios.

Included in the original Unocal acquisition was the Ninilchik unit. The onshore field runs along the coastline south of the city of Kasilof in the southern Kenai Peninsula. Chevron discovered natural gas in the Tyonek formation in June 1961. Marathon discovered two other nearby fields in 2001 and 2002 and subsequently pursued a development program.

The state formed the Ninilchik unit in 2001 and expanded it to include the former Falls Creek unit in 2003. At that time, the state also formed three Ninilchik participating areas: Falls Creek, Grassim Oskolkoff and Susan Dionne. Susan Dionne was expanded in 2007.

Ninilchik was one of the first big projects Hilcorp undertook in Alaska. The company drilled four wells at the southern end of the unit under its 2013 plan of development.

Although the AOGCC only listed three of those wells as exploratory, all four were part of the same campaign: an effort to learn more about the existing gas fields and to explore the potential for oil. The oil exploration was non-commercial. But the results of the gas wells convinced Hilcorp to consider expanding participating areas and building new pads.

The overall results of the program encouraged Hilcorp. The company initially proposed a six-well exploration program in its 2014 plan and later expanded the program to 11 wells.

As before, the AOGCC classified the entire program as "development," although Hilcorp described the drilling as exploratory. The results of the program once again prompted the company to expand its existing development infrastructure by building new drilling pads.

With its 2015 plan, the nature of the work had shifted. Hilcorp was now describing its upcoming plans as development and delineation work, which has been the case since.

Deep Creek

The exploration needs at the Deep Creek unit were even more pressing than Ninilchik.

Contraction was pending at unit when Hilcorp acquired it. Around the time of the closing of the deal, the state Division of

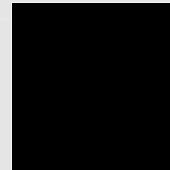
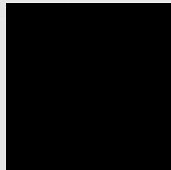
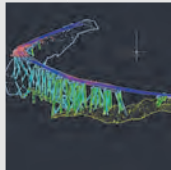
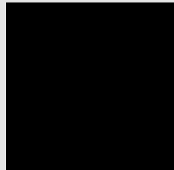
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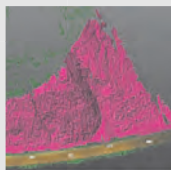
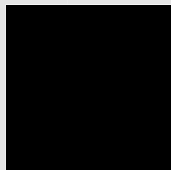
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HILCORP *continued from page 30*

Oil and Gas and Cook Inlet Region Inc. gave Hilcorp six additional months to follow through on its predecessor's exploration commitments.

Existing data suggested the presence of a Middle Happy Valley prospect, south of the producing Happy Valley reservoir. A 2007 report from Netherland, Sewell & Associates estimated probable reserves of 22 billion cubic feet for the entire unit area, suggesting undiscovered reserves in the south. The state wanted exploration on those leases.

Union Oil Company of California brought the Deep Creek unit online in 2004 and drilled some 13 wells between 2003 and 2009. But the company soon lost interest. It included no exploration plans in the final plan of development it submitted for the unit, and the state was requiring exploration activities to be included in whatever unit plan was filed next.

Hilcorp made Deep Creek one of its early priorities. The company drilled three wells and worked over another four wells, added several producing horizons. A 3D seismic survey conducted over 50 square miles of the unit suggested that the resources at Happy Valley were "probably three to four times larger than the current participating area," Senior Vice President for Alaska John Barnes told the Anchorage Energy Task Force in June 2013.

Following the initial development work, Hilcorp shifted to exploration.

After unsuccessfully attempting to expand the unit to include nearby CIRC leases, the company proposed an exploration program from a newly constructed C pad in 2014 and a Middle Happy Valley No. 1 exploration well in 2015. Those projects

Seaview was among the first instances where Hilcorp applied its overall philosophy to a standalone Alaska exploration target.

would have satisfied work commitments, but the company delayed its plans, citing market conditions.

Greystone and Seaview

Hilcorp announced a standalone exploration effort in early 2016. The company drilled the 13,500-foot deviated Greystone No. 1 well from the new Bartolowitz pad that summer on Cook Inlet Region Inc. leases just beyond the southern border of the Deep Creek unit.

Although located on acreage outside any existing unit, the Greystone well supported unit development. The results convinced the state to defer a contraction at Deep Creek.

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

The appraisal program came the following year, when Hilcorp drilled seven stratigraphic test wells at the Seaview prospect, south of Anchor Point and the Cosmopolitan unit.



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point for Enstar, which gets that gas right off to market quickly; that being said, you're still talking about two to three years between right of way, installation, and permitting."

The state Division of Oil and Gas approved a plan of operation for the project in mid-March 2021. The plan includes a pad and two wells at ADL 392664 and ADL 392666.

Under the plan, Hilcorp would build a 2.75-acre gravel pad (300-foot by 400-foot) this April, drill the first well in May with testing in June and the drill the second well in July with testing in August, following by suspension of the wells and general demobilization.

The 10,000-foot Whiskey Gulch No. 1 well would target oil and gas to the south-east of the pad. The 10,000-foot Whiskey Gulch No. 14 well would target gas to the northeast.

The project should not be confused with the Whiskey Gulch unit formed on the North Slope by Brooks Range Petroleum Corp. in 2005 and terminated late the following year.

Iniskin Peninsula

The Iniskin Peninsula across Cook Inlet from Kachemak Bay is one of Alaska's known oil accumulations that has remained undeveloped for logistical reasons.

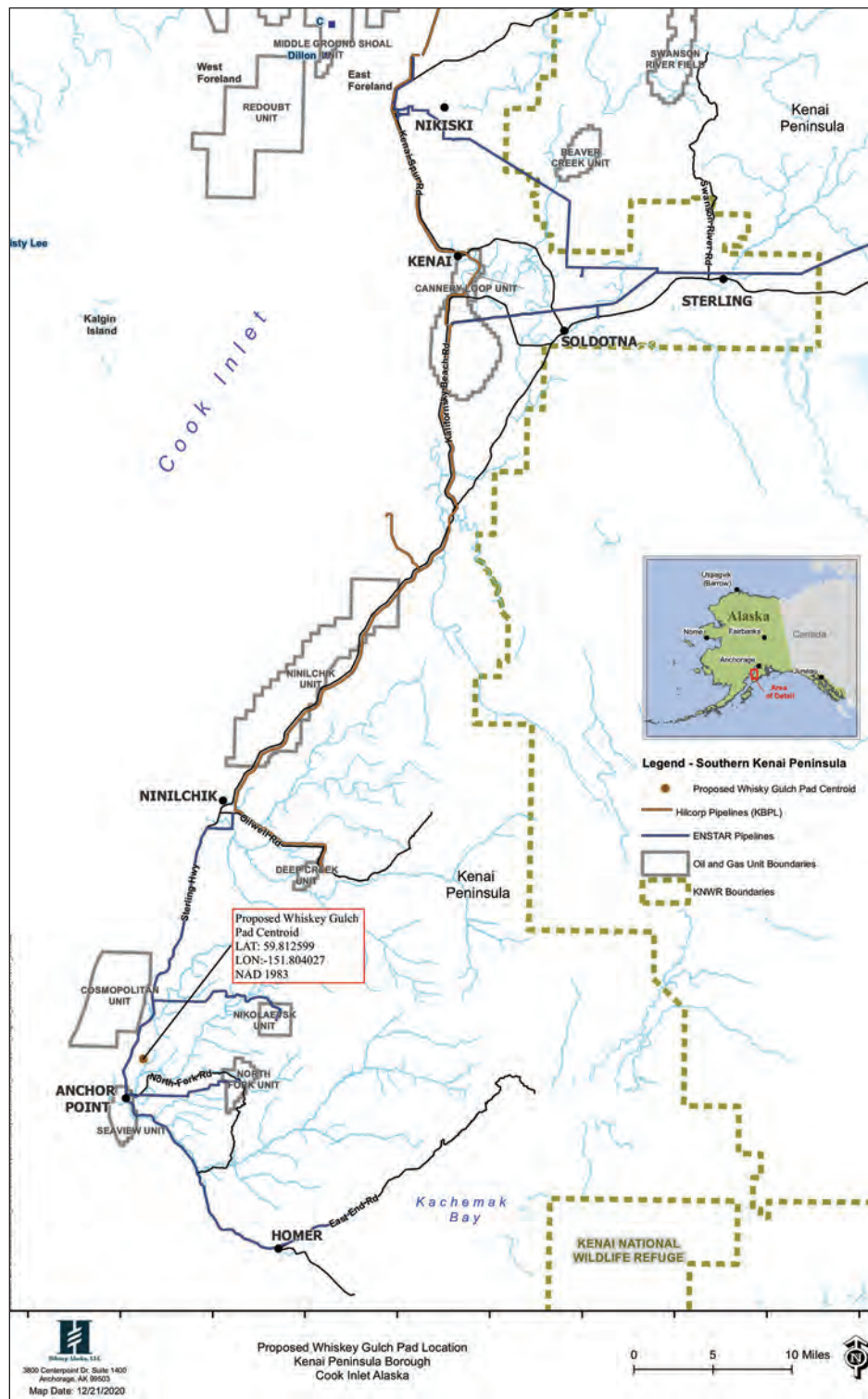
Despite surface indications of oil in the area, exploration drilling in the early 1900s, the 1930s and the 1950s all failed to make a commercial discovery. The problem was low rate of oil flow, a challenge that Hilcorp now suspects could be alleviated by technology.

Hilcorp brought modern exploration to the area in 2013, when it conducted a 2D seismic survey, providing the first information about subsurface structure and stratigraphy.

The survey suggested to Hilcorp that previous drilling might have missed a deeper crest of an anticline in the area. The earlier drilling reached a higher section of the anticline.

Compensating for the low flow rate is the nature of the rock. Current considerations are focusing on two sections — 1,292 and 300 feet thick — of the Middle Red Glacier formation of the Jurassic Tuxedni group, which sources most of the Cook Inlet oil fields.

Those rock sections are within the thermal window for oil and also have fractures consistent with fluid transport. They share characteristics with the Wolfcamp



shale in the Permian basin of Texas, opening the possibility of a tight oil development at the Iniskin Peninsula. The company is also interested in various sandstone formations in the area.

The Iniskin Unit Zappa No. 1 well drilled by Alaska Consolidated Inc. in 1958 had large gas shows and tested between 100 and 400 barrels of oil per day from the Tuxedni.

The next step for Hilcorp is an explo-

ration well. While drilling in the area would be straightforward, moving equipment and personnel would present a logistical challenge.

"We don't like the reservoir, nobody does," Buthman explained, "but what we like is you've got about 9,000 feet of source rock there, right along the Bruin Bay fault in a similar structural position to

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HILCORP *continued from page 33*

Hilcorp had actually been interested in the area for a while. The company acquired an aerial gravity and magnetics survey in 2015 “in order to understand dry holes in the area,” as the company later revealed, and also 20.54 miles of 2D seismic shot in 2016.

Following the shallow stratigraphic program, Hilcorp built the Seaview pad on private land and planned two 10,000-foot directional exploration wells. The Seaview No. 8 well targeted both oil and natural gas, and the Seaview No. 9 well targeted only natural gas.

The company described the wells as having three phases: a directional section through the Lower Sterling and Beluga formations; a deeper lateral through the Lower Tyonek, Hemlock and deeper formations; and perforation and flow-back testing on the wells.

Seaview No. 8 discovered commercial quantities of gas in four zones the Tyonek formation, leading Hilcorp to shift toward development activities at the prospect.

The company later explained that the shallow stratigraphic wells were a way of triangulating the ideal location for a deeper well. “We logged them, correlated them, mapped them, and we drilled our discovery well: Seaview No. 8,” Hilcorp’s Buthman told the Alaska Geological Society after the season.

Hilcorp originally intended to bring Seaview into production in November 2020, but construction delays on an associated 2-mile pipeline pushed the startup to this summer.

Hilcorp followed the Seaview program with two stratigraphic test wells near Deep Creek — Deep Creek SW 3 and Deep Creek SW 4. But the results of the Greystone and Seaview programs had made Hilcorp think differently about Deep Creek. “Both these new field wildcats changed our ideas about successful trap types and reservoirs,” the company told the state. Instead of pursuing traditional exploration, the company wanted to combine seismic with shallow exploration in the Lower Sterling and Upper Beluga.

The state was unconvinced by the plan. In mid-2019, after years of deferrals, the Division of Oil and Gas contracted the unit down to its participating area and producing leases.

Seaview was among the first instances where Hilcorp applied its overall philosophy to a standalone Alaska exploration target. Buthman said Hilcorp had used modern airborne gravity gradiometry and magnetic surveys, along with geologic field surveys, drainage anomaly studies and seismic surveys to optimize well locations. In his talk, he said that the company would be considering other exploration opportunities such as the Blackbill prospect in the lower Cook Inlet, as well as possible opportunities in Iniskin Bay.

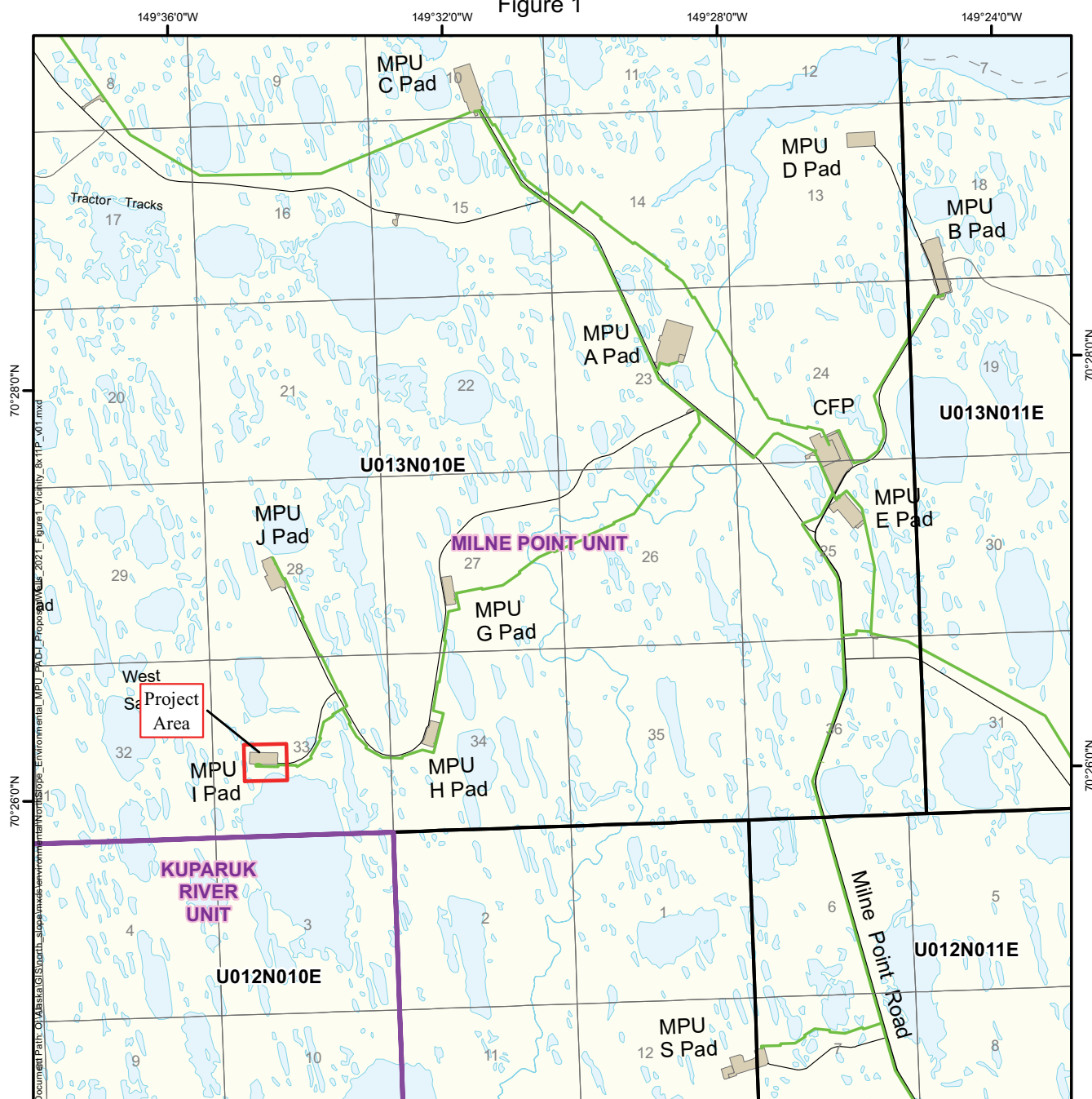
Whiskey Gulch

Hilcorp drilled five stratigraphic test wells at the Whiskey Gulch prospect on private land north of Anchor Point in late 2019 and with eight more the following year. Earlier this year, the company proposed a two-well exploration program at Whiskey Gulch. The 10,000-foot wells would target gas (and some oil) from a new Whiskey Gulch pad.

“The team is very excited about this one,” Hilcorp Alaska Kenai team lead Jennifer Starck said on Feb. 19, at an Alliance Kenai digital luncheon. “The thing that’s most exciting about this one is ... it’s all on roads, with a very known, feasible connect

continued on page 36

Figure 1



Project Location:
Milne Point Unit - I Pad

Latitude (Decimal Degrees): 70.436318, NAD 1983
Longitude (Decimal Degrees): -149.583119, NAD 1983

Alaska State Plane Zone 4, NAD 1983
X = 1691546.15
Y = 6009215.71

Sec. 33, T13N, R10E, Umiat Meridian

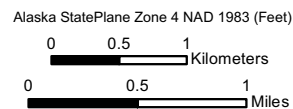
ADL#: 025906
Adjacent Property Owner: State of Alaska

Legend

- Existing Pipeline (Above Ground)
- Oil and Gas Unit Boundary
- Gravel Footprint



**Milne Point Unit
MPU I PAD
Proposed Wells
Vicinity Map**



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HILCORP *continued from page 34*

the largest oil field in the basin which is McArthur River, which made about 650 million barrels of oil so far. That was our analog there.”

Cook Inlet OCS

Hilcorp is also pursuing a prospect in the Cook Inlet outer continental shelf.

The company acquired 14 leases in the lower Cook Inlet southwest of Kachemak Bay in a June 2017 sale and has recently been permitting exploration over some of the acreage.

The U.S. National Marine Fisheries Service granted early permission for a multiyear program including a 3D seismic work, site clearance and drilling over several years.

Hilcorp conducted the offshore 3D seismic program in the summer of 2019, revealing a 65,000-acre, four-way closure with the oil discovery at the top. The company received a Bureau of Ocean Energy Management permit in May 2020 to conduct a geo-hazard site clearance survey over 11 leases in the area, covering approximately 88 square miles.

The work was ultimately delayed by the restrictions brought about during the coronavirus pandemic. Earlier this year, the company applied for a new permit for this summer.

The next step is using the Seadrill West Epsilon jack-up rig to drill between two and four exploration wells in the coming years. Although the Cook Inlet basin is currently home to two jack-up rigs — Spartan 151 and Randolph Yost — both are apparently restricted to drilling in shallower waters, whereas Seadrill West Epsilon can stand in nearly 400 feet.

The Blackbill prospect, as Hilcorp is calling it, would follow-up on the Raven No. 1 well drilled by ARCO Alaska in 1982. The prospect sits due west of the town of Homer.

Blackbill sits in a Cretaceous reservoir within the Mesozoic sequence and would be the first commercial production from a Cretaceous reservoir in the Cook Inlet basin.

Buthman described the four-way structure as “beautiful” but noted that the reservoir is shallow, “and that’s why ARCO really didn’t develop it at the time,” he said.

OCS exploration is somewhat rare in Alaska and has been

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even rarer in Cook Inlet.

Blackbill lies considerably south of the current terminus of producing fields in the region — the Cosmopolitan unit and the Seaview unit. But it is north of the Augustine-Seldovia Arch, which serves as a geologic dividing line in the region. South of the arch, the Tertiary strata underlying the producing Cook Inlet fields begins to thin out.

The program is currently involved in some litigation.

The company applied in 2018 for National Marine Fisheries Service authorization under the Marine Mammal Protection Act to take marine mammals by harassment caused by noise generated by oil and gas activities, including 2D seismic exploration in Cook Inlet and drilling exploration and development wells from a rig to be transported by tugboats.

The program covered drilling in the lower Cook Inlet and the Trading Bay region.

Cook Inletkeeper and the Center for Biological Diversity challenged the approval, saying that it violated several federal laws, including the National Environmental Policy Act.

In late March, U.S. District Judge Sharon L. Gleason upheld the authorization but required some additional mitigation measures to account for noise cause by the tugboats.

North Slope

Through a separate series of deals with BP Exploration Alaska Inc., Hilcorp Alaska expanded its holdings in the state to include a large portfolio of North Slope properties.

Through the two stages of the sale, Hilcorp acquired operatorship of the Prudhoe Bay unit, the Milne Point unit, the Northstar unit and the Liberty unit, as well as major interests in the Exxon-Mobil-operated Point Thompson unit and exploration leases in the 1002 area of the Arctic National Wildlife Refuge — plus a range of midstream assets.

As with Cook Inlet, Hilcorp has been focusing on reviving existing assets, particularly those at Milne Point and to a lesser extent Northstar and Duck Island. And with the recent acquisition of acreage in and operatorship of the Prudhoe Bay unit, Hilcorp's workload increased considerably.

The most notable exploration prospect to come from the acquisition is ANWR.

When Congress created the 19 million acre refuge in 1980, it marked 1.57 million acres of coastal plain for resource development, known as Area 1002, after a section of the law.

To date, only one well has been drilled in the area. Chevron and BP partnered in the mid-1980s on the 15,193-foot KIC No. 1 well, drilling the \$40 million well over two winter seasons on a 92,000-acre lease of Native land in the 1002 area. Arctic Slope Regional Corp. owns subsurface rights at the lease and local village corporation Kaktovik Inupiat Corp. owns surface rights. The KIC well was named after the village corporation.

In the three decades since, the KIC No. 1 well has become mythic for its secrecy. Only select people at Chevron, BP and ASRC, as well as a few State of Alaska geoscientists, are believed to have seen the well results. A slightly larger group of companies — BP, Chevron, Anadarko, ConocoPhillips, ExxonMobil, Hess, Marathon, Murphy, Oxy, Shell and Total — have also seen the results of a 2D seismic survey conducted over the area.

When the two companies renewed the KIC No. 1 lease in 1999, executives vaguely touted the quality of the prospect. In a press release at the time, then-Exploration Vice President for BP Exploration Alaska Neil Ritson said, "ANWR offers the greatest potential for a world-class oil discovery on the North Slope," while then-Exploration Manager for Chevron Dave Birsa said, "The ANWR coastal plain ... is on trend with the prolific oil fields of the central North Slope and has significant geological potential."

Over the course of its existence, the ANWR coastal plain has become a symbol in the debate over American energy and environmental policy. Some see ANWR as a major source of domestic energy and jobs. Others see it as a plunder of wild lands at a time when the world should be shifting away from extracting hydrocarbons for energy.

Those opinions are increasingly aligned with parties. Today, it is generally understood that Democratic administrations will limit ANWR development while Republican administrations will advance it. The needle moved toward extraction in the mid-2000s, during the Bush administration, and again in recent years, during the Trump administration, and away from it during the Clinton, Obama and now the Biden administrations. ●

Contact Eric Lidji at ericlidji@mac.com



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 **Oil Search**

Jade Energy: Economics key to advancing Sourdough

Uneconomic with 40% Alaska NPSL tax; no one will fund & 1990s oil discovery on state land will remain undeveloped; Dunleavy offers fix

By **KAY CASHMAN**
Petroleum News



ERIK OPSTAD

Planning and permitting for Jade Energy's 2022 winter drilling in the eastern North Slope Sourdough prospect is "on track and expected to accelerate" as ELKO International team members complete Emerald House's (88 Energy) drilling operations at the Merlin 1 exploration well on the other side of the North Slope. That is what Erik Opstad, 100% owner of Jade parent ELKO told Petroleum News in an email March 19, 2021.

But as of April 6, 2021, it appears 88 Energy will have to go back in to sidetrack Merlin 1 next winter. How and if that will impact Sourdough drilling, which appears to be using a different drill rig, is unknown as The Explorers 2021 magazine goes into production.

That said, another of the Sourdough project's major hurdles is

Jade Energy LLC



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still unresolved — the development is not economic while burdened with a 40% state of Alaska net profit share lease tax, a 12.5% royalty, "plus other commercial limitations currently associated with ADL 343112," Opstad told Petroleum News March 19.

Jade is working with Sourdough stakeholders, he said, and making progress toward the mitigation of these limiting commercial issues, but there is still "some way to go."

A net profit share lease, or NPSL, requires the lessee to pay the



Julius R is the newest platform in the Cook Inlet Kitchen Lights Unit; owned and operated by Furie, the only Alaskan owned and operated oil & gas production company.



state a share of net profits — in addition to a traditional royalty percentage, the Alaska Department of Natural Resources' Division of Oil and Gas said in a February 2021 presentation to the Alaska Senate Resources Committee.

Royalty payments begin with commercial production and are assessed on gross revenue, while net profit share revenue payments begin when the NPSL reaches payout stage — after exploration and development costs, with interest, are recouped by the operator.

Dunleavy's remedy

DNR is authorized to modify royalties to allow for continued or incremental production. Legislation proposed by Alaska Gov. Mike Dunleavy would extend that ability to NPSLs, potentially extending the life of a field as well as promoting the development of new fields such as Sourdough, which would result in additional royalties, net profit share, taxes, etc. that the state would not receive without the NPSL modification.

Currently, DNR said, it thoroughly reviews and negotiates a modification package for NPSLs and then must submit a proposal to the Legislature, with legislation required for the modification to take effect.

NPSL and royalty modification applications to DNR are "reviewed by a multidisciplinary group of professionals within several sections inside the Division of Oil and Gas, mainly by the Commercial and Resource Evaluation sections, with collaboration from Leasing, Units, Royalty Audit, and Royalty Accounting," DNR communications director Dan Saddler told Petroleum News in a March 2021 email. "Current statutes also give DNR the option of procuring consulting services, at the applicant's expense, on issues in which we don't have in-house expertise."

The main challenge to appraise and develop this mid-1990s BP Sourdough oil discovery, Opstad said, is that the development must be "shown to be commercial," otherwise "no one will fund it! Economics 101!"

Dunleavy's solution will allow DNR's commissioner to have the final say, not the Legislature.

Net profit share leases were issued by the State of Alaska between the late 1970s and the early 1980s. There are currently 26 active NPSLs on the North Slope, with rates ranging from 30% to 79.59%, DNR said.

The progress and supporting information on Dunleavy's bills can be found here:

- HB 81 at:

<http://www.akleg.gov/basis/Bill/Detail/32?Root=hb%2081>

- SB 61 at:

<http://www.akleg.gov/basis/Bill/Detail/32?Root=sb%2061>

Third plan of development

Apparently hoping for the best, Jade is moving ahead with its first Sourdough appraisal well, Jade 1, shooting for a Feb. 15, 2022, spud date.

Activities the independent anticipated in its third and 2021 Sourdough plan of development (approved Dec. 14, 2020, by the Division of Oil and Gas), include the following, along with the status of the work on March 19, 2021, per Opstad:

1. Equipment and materials mobilization by snow trail to Point

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JADE ENERGY *continued from page 39*

Thomson in first quarter. This has been delayed, as the necessary equipment is tied up on Merlin 1 in 88 Energy's Peregrine Project in the National Petroleum Reserve-Alaska.

2. Permitting for 2022 winter drilling. This is on track.
3. Mobilization planning to Point Thomson. This is on track.
4. Third bathymetric survey of the service pier. This is on track and expected to occur in mid-July 2021 during the open water season.
5. Service pier approach dredging. This is dependent on bathymetric survey results. Jade has a U.S. Army Corps of Engineers dredging permit in hand.
6. Rig mobilization by barge to Point Thomson. It is still expected to occur in September 2021.

The main challenge to appraise and develop this mid-1990s BP Sourdough oil discovery, Opstad said, is that the development must be "shown to be commercial," otherwise "no one will fund it! Economics 101!"

Slice of Point Thomson

Jade filed its third plan of development for Sourdough in coordination with ExxonMobil, operator of the Point Thomson unit, and other PTU lease owners, on Nov. 1, 2020. The third POD for Point Thomson unit Area F, Tract 32, runs from Jan. 1, 2021, through Dec. 31, 2021.

Area F, which was created by the terms of the Point Thomson Unit Settlement Agreement between ExxonMobil and the other owners, consists of 7,647 non-adjacent acres in the northeastern and southeastern corners of the PTU (see map in the pdf and print versions of this story).

In 2021 Jade intends to develop a detailed barge mobilization plan for Nordic Rig 3 while also examining a snow trail alternative that may now be possible due to the availability of new technology.

Jade became majority owner and operator of PTU Tract 32, ADL 343112 in the southeastern portion of Area F, by agreement with ExxonMobil in mid-2018.

In 1997 BP estimated the Sourdough prospect held 100 million barrels of recoverable oil, based on the results of its Sourdough 2 and 3 wells.

If developed, Sourdough will be the farthest east of all North Slope producing fields.

Some of the work in the second POD was to focus on selecting additional delineation and development well locations particularly in any "expansion" areas that may be added to ADL 343112 resources through negotiations with the other PTU working interest owners.

Various 3D seismic surveys have been acquired and interpreted over Area F.

One of these was new compressive sensing imaging, or CSI, seismic 3D data from the area during the 2017-18 winter season with parameters optimized to characterize Brookian strata. The CSI 3D survey was the first of three field studies.

"On the basis of CSI 3D seismic data, we have evaluated a location for Jade 2 sited considerably to the west of Jade 1 and adjacent to the PTU airport to prove up additional resources in ADL 343112," Opstad said Oct. 27, 2020.



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“We also have focused on working up additional delineation/development well locations in ‘expansion’ areas that may be added to ADL 343112 resources.”

Challenging element

Mobilization of a drilling rig and heavy equipment is one of the more challenging elements of Jade’s plan for Sourdough. Most drilling programs on the North Slope access their drill sites by ice or gravel roads as will Jade, but the Area F POD adds a barging program between West Dock and the PTU Service Pier to the mix as an intermediate step.

Jade expects to stage the rig, equipment and some additional materials required to support drilling into a laydown area designated by the PTU.

Barging operations would occur in the summer and require some lead time to organize, particularly given the fact that some dredging will be required to land a barge at Point Thomson and potentially depart West Dock.

As part of its second plan of development, the Alaska independent pursued approvals to conduct a small-scale scree operation on the PTU Service Pier Approach.

Accomplished in second POD

Among, but not all, the work done in the second POD period identified by Jade in its third POD filing was data evaluation. “Ongoing work conducted as part of developing the 2nd POD raised several concerns relative to Area-F development,” Jade wrote.

Given Jade’s interpretation of the Sourdough volumetric resources, at current oil prices development did not appear to be

economically viable, particularly when burdened with a 40% net profit share and a 12.5% royalty, neither of which the division was able to modify.

During first quarter 2020 Jade and the agency “engaged in an intense and lengthy bout of economic modeling of Area-F resources using state of Alaska methodology. The details and results of that work are confidential under 38.05.035A(8), but we can say that the parties now understand the economic challenges to commercial development of Area-F,” Jade said in the third POD.

Among other things, a repeat bathymetric survey was also done in the second POD period. In September 2020 Jade executed the first offshore bathymetric survey of the PTU Service Dock Approach conducted in Alaska using a helicopter. Although one of Jade’s parent companies (ELKO International LLC) had been using helicopters to survey onshore lakes for several years to meet state permit requirements, “this fall was the first time those techniques had been employed in the offshore environment,” Jade said.

In 2021 Jade intends to develop a detailed barge mobilization plan for Nordic Rig 3 while also examining a snow trail alternative that may now be possible due to the availability of new technology.

Opstad, who oversees Jade’s operations in Alaska and is a 50% owner in the company, is a State of Alaska certified professional geologist who has worked the North Slope for 35 years, including a stint with BP in various roles and as a principal and general manager of Savant Alaska. ●

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Oil Search rises to Alaska, market challenges

Bruce Dingeman: On track to deliver first oil in 2025, company has conveyor belt of opportunities that go well beyond Pikka Phase 1

By **KAY CASHMAN**
Petroleum News

On March 19, 2021, Bruce Dingeman, president of Oil Search Alaska, summarized the accomplishments of Oil Search since it officially entered the state in early 2018 with regulatory approval of its partial purchase and option on Armstrong Energy JV's interest in the Pikka and Horseshoe area leases west of the central North Slope, becoming a partner with Repsol in the process.

Within months, Oil Search took over operatorship of the leases. At the time of acquisition, Oil Search said the deal was made based on some 500 million barrels of recoverable oil, noting Armstrong's rough estimate was more than 1 billion barrels.

The ASX-listed publicly traded parent Oil Search Ltd. of Sydney, Australia, told analysts it paid \$400 million for a 25.5% interest in the Pikka unit and adjacent exploration acreage and a 37.5% interest in the Horseshoe block and the Hue shale.

Oil Search had the option (which it took), exercisable until June 30, 2019, to purchase all the Armstrong JV's remaining interest in the Pikka unit and the Horseshoe block (another 25.5% and 37.5% respectively) as well as an additional 25.5% interest in adjacent exploration acreage and 37.5% in the Hue shale.

In March 2021, the percentages have changed with Oil Search generally holding 51% and Repsol 49% and the partners looking for a third partner that sources say would result in Oil Search and Repsol each holding 35% and a new partner 30%.

Seven holes in 3 years

Back to March 19, 2021, and Dingeman's presentation at the Meet Alaska virtual conference, in which he covered OSA's first three years in Alaska.

"We've drilled seven holes to date in the three years we have been operator," he said.

Parent Oil Search Ltd. is 90 years old with a market cap of AUS\$9 billion, Dingeman said.

Pikka Phase 1 is just the start, he said, with "additional phases from Pikka and other acreage. We have a conveyor belt of opportunities that go well beyond our initial Phase 1."

Currently, "we have about 125 employees and 25 contract staff in Alaska and we'll increase those numbers as our project progresses. We've grown from three staff in early 2018 to about 150 now," Dingeman told Meet Alaska's virtual attendees.



KEIRAN WULFF



BRUCE DINGEMAN

Oil Search

COMPANY HEADQUARTERS:

Perth and Sydney, Australia

TOP COMPANY EXECUTIVE:

Keiran Wulff, managing director

ALASKA SUBSIDIARY: Oil Search (Alaska) LLC

ANCHORAGE OFFICE: Two floors in BP building, 900 E Benson Blvd., Anchorage, AK 99508

TOP ALASKA EXECUTIVE: Bruce Dingeman, president, Oil Search Alaska

TELEPHONE: 907-375-6900

WEBSITE: www.oilsearch.com



"During last winter's drilling and civil program we had about 1,000 people at the peak of that activity, spread across 18 camps. Our team has deep Alaska experience and capability to deliver a major project of this scope," he said.

Oil Search's land position is "material and it includes both near-term development assets and longer-dated exploration opportunities," Dingeman said.

First drilling season

Oil Search's first North Slope winter drilling season was the 2018-19 season, most of which took place in early 2019.

"We drilled four penetrations then, a lot of which were successful. It was also a key point in getting federal regulatory approval with the U.S. Army Corps of Engineers. And we actually incorporated 26 modifications to that permit application in sensitivity and response to the feedback from the local community. We also reached the landmark land use agreement ... with Kuukpik and then we got approval from the North Slope Borough for our master plan which includes rezoning and allowed us to begin plans for our civil work," Dingeman said.

Winter 2019-20 season

Moving up to the 2020 winter season, which is technically referred to as the 2019-20 season, and Oil Search's last active winter drilling season to date, the company "completed three additional wells, or penetrations, all of which were also successful and then entered into our large civil works program," Dingeman said.

Oil Search received its permit for inclusion of a seawater treatment plant as part of its project development plan.

"At that point we also shifted through a recycle effort to a new phased development concept," he said.

continued on page 44

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OIL SEARCH *continued from page 42*

In recapping 2020, Dingeman said: “We had excellent and outstanding support from the contractor community, both securing gravel from an ASRC pit and a (North Slope) borrough pit to complete that activity. We put down over 2.3 million cubic yards of gravel — our main Spine Road, three pads, 200-foot bridge and a whole lot of culvert, so it was a huge program. We had a truck running every 60 to 90 seconds for almost the entirety of the 90-day period to complete that work.”

COVID-19 “really took hold and the price downturn followed that. Early last year (2020) we realized that our former concept wasn’t going to work,” Dingeman said. “So, we went through a recycle process to get costs down and make it more resilient to, for low oil prices. That re-design work was largely completed during 2020.”

And from it, Oil Search switched to a phased development plan for Pikka, in which the first phase would provide the cash needed for subsequent phases.

Finally, he said, the three penetrations OSA drilled in early 2020 resulted in two new discoveries. Those penetrations were in the Mitquq and Stirrup prospects and they “really unlocked significant running room beyond our core Pikka asset.”

In late 2020, Oil Search had a significant write-up of its resource base by an independent, third party auditor, per parent Oil Search Ltd.’s Nov. 18, 2020, ASX filing that reported the Oil Search/Repsol joint venture’s 2C contingent resource increased by 33%, taking it from 728 million barrels of oil to 968 million barrels — and putting it 93% higher than at asset acquisition in 2018 (see chart in the pdf and print versions of this story).

And those numbers do not include the Stirrup and Mitquq discoveries, which have not yet been appraised.

FEED entry for Pikka

“So, we’re starting to make our way up from base camp (see graphic of mountains near start of this story in the pdf and print versions) and we’re approaching FEED, or front-end engineering and design, entry,” Dingeman said.

In February 2021, Oil Search and its partner Repsol formally announced FEED entry.

“It was covered here locally, at Petroleum New as well as globally at Upstream and I think Oil and Gas Journal and other publications. It was really a huge milestone for us, especially considering the difficult environment we find ourselves in,” he said.

“To me it is really a testimony to the quality of our project. The feedback we’ve gotten from both our shareholders and the feedback from the press and other stakeholders has really been very good.”

Pikka project scope

Initially, three drill sites were part of the \$6 billion Nanushuk Development — ND-A, ND-B and ND-C.

The new phased development plan involves one drill site, Dingeman said.

Previously OSA was looking at a \$6 billion project. “We’ve skinned that down to about \$3 billion, pursuing a single drill site,” he said. “But, more importantly, we’ve looked at value engineering and changing our concept to squeeze further costs out of it while maximizing recovery and production benefits. That’s resulted in us being able to lower our breakeven costs from \$45 to sub-\$40 (per barrel). This includes a 10% rate of return in that number, so that makes it more resilient to the lower price environment that we find ourselves in.”

Dingeman said there are “other attributes that are beneficial

Upending ANS exploration

The Nanushuk formation forms part of the Brookian sequence, the youngest and shallowest of the major North Slope petroleum bearing rock sequences.

Although rocks of the Brookian are found across the entire North Slope, the Nanushuk is found mainly west of the central North Slope (see full story in the May 31, 2020, issue of Petroleum News, titled “Exciting outlook”).

Following the discoveries of the Prudhoe Bay and Kuparuk River fields in rock reservoirs much older and deeper than the Nanushuk, exploration mainly focused on these deeper rocks, with Brookian strata such as the Nanushuk generally ignored.

That is, until 2015, when Bill Armstrong took a contrarian view of conventional North Slope exploration strategies, brought in a well-heeled partner, Repsol, and made the Pikka discovery to the east of the Colville delta. That discovery upended expectations for potential oil volumes in the Brookian.

In late 2017 (closed in 2018) Armstrong and a minority partner sold their interest in the Pikka and Horseshoe area leases to Oil Search.

In its initial 2017 release of information Oil Search said it would “form a long-term partnership with Armstrong, leveraging its technical capabilities and experience in the identification of additional potential growth opportunities in Alaska.”

That deal with Oil Search gave Armstrong the opportunity to pursue his geologic ideas across the North Slope, as the companies signed an area of mutual interest agreement that allowed Oil Search to purchase 50% of any acreage Armstrong acquired in northern Alaska and take over operatorship of those leases.

Bill Armstrong, who had been following Oil Search since 2014, chose the ASX company over other bidders because he thought it was the best choice to move Alaska exploration and development forward.



BILL ARMSTRONG

—KAY CASHMAN

with this change. We went from a large sealift solution for our processing facility to a modularized standardized solution for that processing kit.”

That means it “can be sourced in a way that it can be transported by road instead of sealift, so it takes us out of that seasonality window,” giving Oil Search “more flexibility in level loading our work as we progress the project. We feel we have eliminated some execution risks as a consequence,” Dingeman said.

The rest of 2021

“So that’s where we’ve been,” he said. “I’d like to pivot now to where are we going. We’re part way up the mountain, so we’re going to press ahead now to that FID point ... or project sanction ... later this year,” FID being the final investment decision.

In his March 19, 2021, Meet Alaska presentation Dingeman

addressed what Oil Search would be doing at Pikka in the coming months, expecting the FID to happen at the end of 2021.

Phase 1 involves a single drill site, ND-B, and a production facility with an 80,000 barrel-a-day capacity that will begin producing oil by 2025 from the first major Nanushuk reservoir discovery on Alaska's North Slope.

Construction is expected to begin after FID in late 2021, which will likely be preceded by the equity sell-down of 30%, with Oil Search remaining the operator per a previous agreement between it and Repsol.

As Dingeman indicated, Oil Search is well positioned to proceed, having completed a significant construction effort in 2020, including pads for the Pikka ND-B drill site, production facility and operations center; a 192-foot bridge over the Miluveach River; and an 11.5-mile gravel road that allows year-round access from existing North Slope infrastructure to Pikka.

The company's plans include 43 wells from ND-B.

"It's only a 20-acre pad so we're really being conscious of our footprint," Dingeman said, noting the wells are oriented towards the northwest, going out to under the Colville."

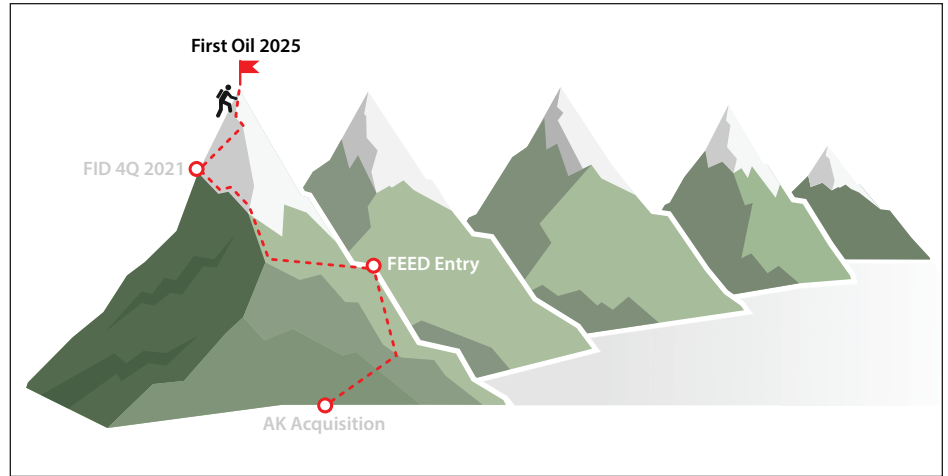
The seawater treatment plant at Oliktok Point, "included in our scope ... includes nano filtration technology with sulphate removal. This provides the high quality water that meets our needs in a reliable, low-risk and cost-efficient way because we really have demanding waterflood needs in terms of water quality and production efficiency."

Oil Search's "design approach allows for subsequent phases to be built on" the 80,000-barrel-a-day facility, "so we're not cannibalizing any of the future benefits by taking this phased approach," Dingeman said.

Key milestones to FID

Second quarter 2021, Dingeman said, "is really about completing the detailed progress engineering work and progressing that. It's about preparing implementation plans, getting the contracts ready to be able to execute at approval of FID, and then preparing all the work for our internal controls and economics."

Third quarter, he said, "includes finalizing the case for our internal partner funding approvals, and ... we've got a number of assurance reviews just to make sure it meets our quality standards, and that we've identified all the key risks and appropriately satisfied all the preconditions necessary so that it's appropriate to proceed to FID."



Stirrup/Horseshoe next?

The Stirrup 1 exploration well drilled by Oil Search Alaska in early 2020 had one of the highest flow rates of any Nanushuk single-stage stimulation of a vertical well on the North Slope to date, the company's Sydney-based parent said April 21, 2020.

Approximately seven and a half miles west of the 2017 Horseshoe 1 discovery well and almost 28 miles southwest of the proposed Pikka unit development, the Stirrup 1 well successfully penetrated the Nanushuk reservoir and encountered an oil column with net pay of 75 feet.

The wellbore was cored, perforated through a single-stage simulation and shut-in for six days to enable pressure build-up prior to testing in which Stirrup flowed at a stabilized rate of 3,520 barrels of oil per day, exceeding company expectations.

Stirrup is a direct analogue to the Horseshoe 1 Nanushuk discovery and as such the company said the new find could underpin a possible standalone Horseshoe development that would follow Pikka development. Or it could represent a low-cost tie-back to Pikka.

The other exploration wells drilled in early 2020 were the Mitquq 1 and its sidetrack Mitquq 1 ST1.

After discovering oil in the primary Nanushuk reservoir, the Mitquq 1 well was drilled into the secondary Alpine C formation where it encountered 52 feet of net hydrocarbon pay, comprising 31 feet of net oil pay and 21 feet of net gas pay. A comprehensive suite of wireline logs, pressure data and hydrocarbon samples were collected prior to the wellbore being plugged back to allow for the drilling of a sidetrack, Mitquq 1 ST1, to appraise the Mitquq 1 Nanushuk discovery.

The sidetrack intersected the Nanushuk and encountered approximately 172 feet of net hydrocarbon pay, including a 29-foot gas cap.

The wellbore was logged and cored and in late March a flow test was conducted with a single-stage stimulation. The test included a cleanup, flow period and a six-day pressure build-up, with the well achieving a stabilized rate of 1,730 bpd.

Located 5.6 miles east of the proposed processing facility for the Pikka development, Oil Search sees the Mitquq prospect as a "high value tieback" to future Pikka infrastructure.

—KAY CASHMAN

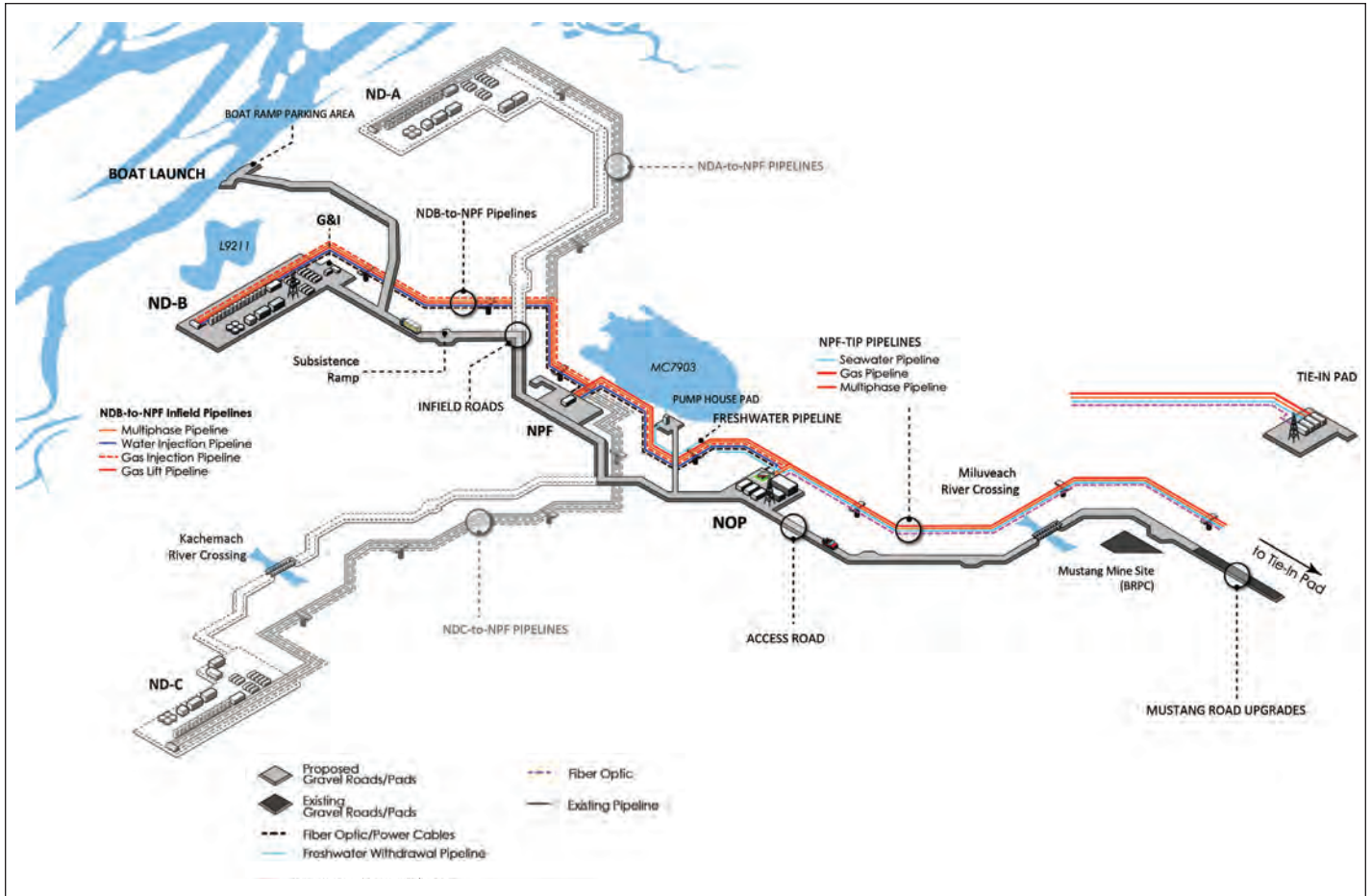
Dingeman also talked about regulatory approvals: "Our state regulatory approvals are routine, and we really need your help to assure they remain that way. This is especially important given that all of our oil and gas development opportunities are to the benefit of Alaska's economy."

Partnership, Dingeman said, "is in our company DNA. We know that we can't

succeed on our own and we'll all win if we work together to deliver this project. We really need your support to receive these timely regulatory approvals, and we're confident that together we can coordinate our activities for multiple projects, all for Alaska's benefit and success."

"Assuming we meet all our preconditions

continued on page 46



OIL SEARCH *continued from page 45*

for FID, we'll take sanction in the fourth quarter."

Stakeholders, Arctic

Stakeholder alignment is an important factor in getting final sanction approval from Sydney, Dingeman said.

"This isn't just internal with our partner Repsol, this is to make sure we are aligned with the needs of the community, the borough, the state — all key stakeholders that have interactions with our project," he said.

Prior to Dingeman's Meet Alaska presentation the most recent news on Pikka came from an investor briefing and two ASX filings, followed by a Feb. 22, 2021, Petroleum News interview with parent Oil Search Ltd.'s top executive Keiran Wulff, formerly president of the Alaska business unit.

Oil Search's focus will continue to be 100% on state versus federal lands in Alaska, he said.

If Pikka was in any jurisdiction other than the Arctic, it would be "one of the hottest projects on the planet ... simply because of its proximity to infrastructure, its upside in resource, and the fact that it ... has very, very strong environmental controls," he said.

For the upcoming divesture, Wulff said, Pikka's Arctic location for some companies means "it's outside the bounds of where they're looking at expanding ... regardless of the quality of the project. Having said ... that, we actually do have a number of companies who have maintained interest (in buying into the JV) because it is a conventional project, and it has a low-cost series of additional growth options."

Wulff said Repsol and Oil Search's agreement to jointly market a

Check this out

In early December 2020 Oil Search Alaska COO Matt Elmer told attendees of a Resource Development Council virtual meeting that the two 2020 Mitquq exploration penetrations discovered a separate reservoir lying to the east and parallel with the Pikka Nanushuk reservoir, its tentative length and width similar to that of Pikka — see pdf or print version of Dec. 13, 2020, Petroleum News to view resource map in story titled "Oil and more oil" that shows this new reservoir.

The same map shows that the 2020 Stirrup exploration well also discovered a separate reservoir that lies west of both Pikka and the Horseshoe discovery — this is the well that had the highest flow rate of any North Slope Nanushuk well drilled from a straight hole with a single stage frac.

—KAY CASHMAN

30% interest will be "attractive to some of the larger companies."

Or, he said, "we also each have an ability to independently market and divest our own 15% equity, which might be more attractive to smaller companies."

But the "strong preference is that we'll be marketing it together. We've set up joint teams. We've got a joint bank. We've got joint advisers. So, it's very much a joint process at the moment," Wulff said.

The process will start in March 2021, he said: "We wanted the conditions in America to settle down a little bit post the election and

the Biden administration coming into office. So, we're starting off with a series of soft soundings ... with companies that have approached us and others that we think would be interested,"

A broader program will commence in April.

"The idea is for us to have indicative proposals around July, August (2021)," Wulff said.

"Clearly, a sell down ... would provide funding support. However, this is really a high-quality asset with a lot of growth. As for any sale, it has to make sense on a value perspective ... for our shareholders," Wulff said.

He pointed out that Stirrup "was recently rated one of the top 10 global discoveries in 2020."

Wulff said the 1 billion barrel 2C resource will go higher once Stirrup and Mitquq are appraised.

Small enviro footprint

Wulff also touts Pikka's "very, very small footprint."

"It's actually sandwiched between existing facilities, ConocoPhillips at Kuparuk and the Alpine field to the west. We're not in a remote area. We can tie into existing pipelines. ... So, this is almost like an offshore development, where we'll be drilling 50 wells from a small pad rather than whole series of wells spotted over the area," he said.

"We genuinely have a world-class team in Alaska that has proven experience in the region. We targeted professionals with clear knowledge and were able to extract an amazing team as demonstrated by their performance to date," Wulff said, noting most of Dingeman's staff came from existing North Slope operators and many had leadership positions in those firms.

Phase 1 contracting

"We have a busy year ahead of us, but we feel we're really on the right path to make this a big success," Dingeman said.

The US\$3 billion gross cost commitment for Phase 1 of Pikka is "roughly two-thirds facilities and construction and about one-third around the wells. ... We will be spending about three-quarter of that \$3 billion prior to first oil" in 2025, he noted.

Down the road

With Oil Search and its partners Repsol and Armstrong together and separately holding hundreds of thousands of acres on the North Slope, company executives have good reason to talk about a conveyor belt of oil prospects that could be developed in the future.

It appears their next project after Pikka will be a standalone development of Horseshoe/Stirrup.

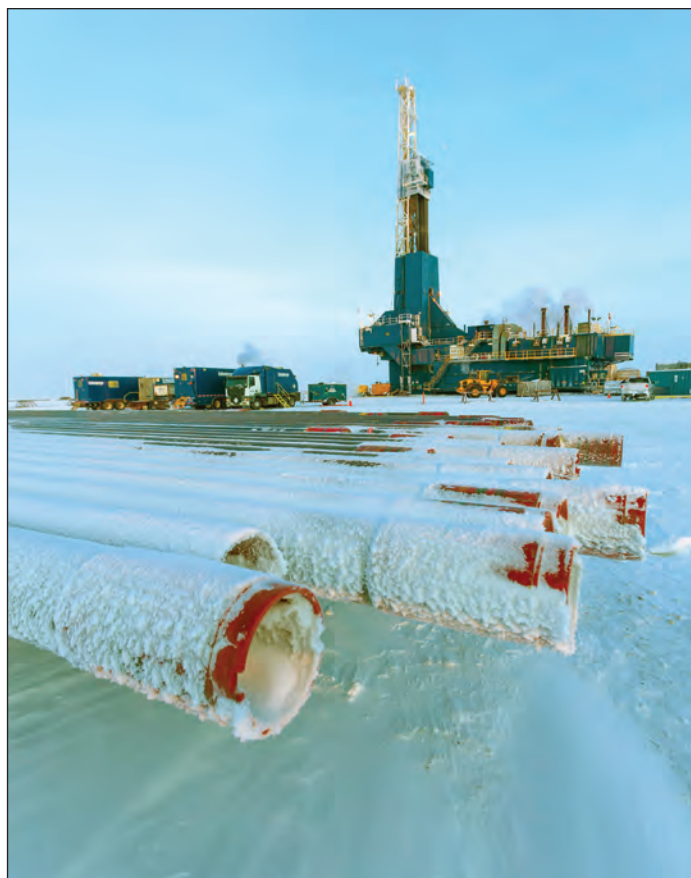
Another prospect mentioned by company executives has been Grizzly, south and east of Horseshoe.

One of the other prospects named by Oil Search execs is far to the east — the 195,200-acre block Armstrong picked up in the November 2018 State of Alaska oil and gas lease sale under the name Lagniappe Alaska. It is south east of Prudhoe Bay and has only been lightly explored by seismic or drilling.

In exercising its option under the partners' area of mutual interest agreement, Oil Search took over operatorship of the Lagniappe block, purchasing a 50% interest from Lagniappe, a 100% owned Armstrong company for approximately \$8 million.

"We're trying to continue to make the play that we discovered to the west, the Nanushuk at Pikka," Bill Armstrong told Petroleum News Jan. 30, 2019, about the Lagniappe leases, although not naming the analogous, lookalike formation.

"It is a very subtle play; that's why it has been hidden for so



COURTESY OIL SEARCH

Mitquq drilling.

long; it doesn't just jump out at you on seismic. ... The amount of running room this concept has is just massive in Alaska. ConocoPhillips is chasing it west, which is great, and we like what they are doing a lot, but going east from Pikka we also see the same thing. We're really excited. It's still a wildcat play. It still has risk, but it has huge potential," he said.

"Every well that has been drilled in the surrounding area has indications of hydrocarbons. So, what little well control there is very encouraging."

In addition to the Nanushuk lookalikes, Armstrong sees "a whole other idea that has never been chased that we like but is nothing like the Nanushuk. Yet, it too is exciting and wild and wide open," he said.

The block of leases has since grown with subsequent acquisitions of adjacent acreage and there are rumors the partners might begin exploration of the area in the winter of 2022.

"There are so many zones, so many objectives out there on the North Slope that could work. You chase one thing and find another. So many discoveries have been found by accident," Armstrong said.

For example, "we were pursuing the Alpine and Kuparuk at Pikka and the Nanushuk was just a secondary objective, yet it was the one that worked the best — although the Kuparuk and Alpine worked too," he said.

"It's hard to believe that in this day and age ... a play like this — Nanushuk — could lie essentially unexplored: onshore, shallow oil, near infrastructure with massive room to run and in, of all places, the United States. Who would have guessed?" ●

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Great Bear Pantheon seeks conventional target

The new partnership is looking for conventional targets in central North Slope

By ERIC LIDJI
For Petroleum News

Great Bear Pantheon's exploration program in Alaska started unconventionally.

Great Bear Petroleum Operating LLC arrived in the state about a decade ago with a big idea. It wanted to find and develop the source of the North Slope's prolific oil fields.

In the years since, and now with the help of London-based Pantheon Resources Plc, the company has pivoted somewhat toward a more conventional program: targeting oil fields contained in some of the same formations that also host those prolific fields to the north.

The new approach recently received encouraging news — with the results of the Alkaid program in 2019 and then with the results of the Talitha program earlier this year. Those results have convinced the company to proceed with appraisal and possibly development.

In late 2020, the state formed the neighboring Talitha and Alkaid units in the central North Slope, south of the Prudhoe Bay unit, along the Dalton Highway. The unit agreements include plans for exploration and development work in the near future that could potentially expand North Slope production south of the legacy fields in the basin.



PAT GALVIN

A new approach

The progress of the past two years builds off more than a decade of work by Great Bear Petroleum, which in turn builds off a half century of limited work by other operators.

The leases within the current Alkaid and Talitha units are lightly explored.

ARCO drilled Toolik Federal 1 and Toolik Federal 2 wells in the vicinity of the current units in 1969. Both wells targeted deeper oil in the region. The company returned with the North Franklin Bluffs Unit 1 well in 1973 to target shallower natural gas. Mobil also looked for shallower gas in the region with the West Kadleroshilik 1 well in 1974.

ARCO drilled the Pipeline State 1 well within the current unit boundaries in 1988, again targeting deeper oil. Conoco drilled the Sequoia 1 well in 1991 and Eni US Operating Co. drilled the Maggiore 1 well in 2007, both testing deeper oil outside the current unit area.

All those earlier wells represented an older way of thinking about the North Slope.

Great Bear Petroleum LLC began its Alaska program in 2010, when it bid more than \$8 million for 105 tracts covering more than 500,000 acres at a state lease sale. The haul accounted for

Great Bear Pantheon LLC

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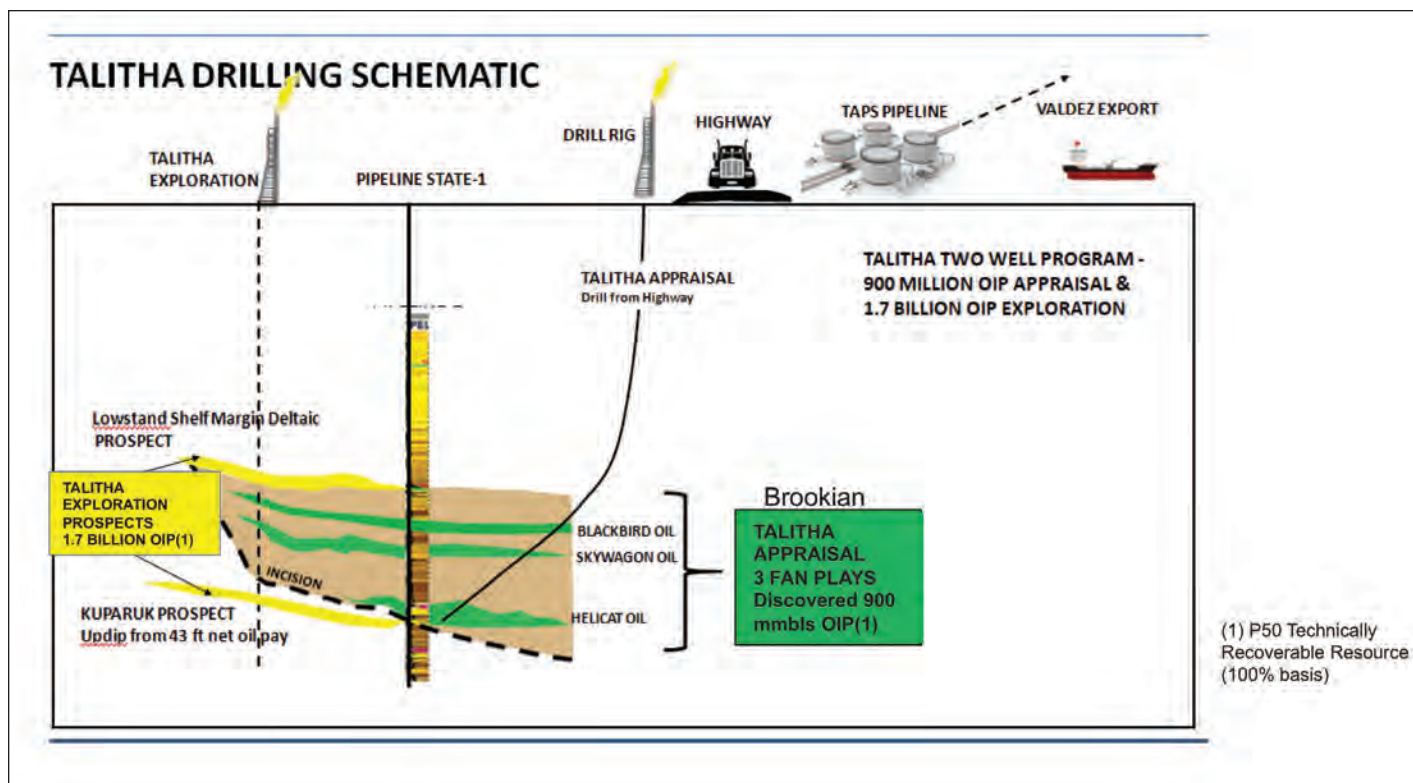
PANTHEON RESOURCES PLC

The newly formed Great Bear Pantheon re-entered and flow tested Alkaid 1 in early 2019.

92% of the high bids in the sale. The company was more successful than it had intended, forcing it to cull to stay below a state-imposed 500,000-acre limit.

At the time, then Division of Oil and Gas Director Kevin Banks compared the Great Bear acquisition to the results from a lease sale the year prior, when the Armstrong Resources LLC subsidiary 70 & 148 LLC also dominated, also took a large block of leases south of the Kuparuk River unit and also briefly became

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GREAT BEAR PANTHEON *continued from page 49*

the largest leaseholder in Alaska.

Looking back, the early 2010s represented a moment when smaller players were considering new ideas for the North Slope. Through various partnerships, Armstrong helped launch the trend toward exploration and development of the Nanushuk formation, which now accounts for much of the planned development on the North Slope. Similarly, Great Bear wanted to bring the emerging trend of unconventional prospects to Alaska.

The principals — Ed Duncan and Bob Rosenthal — both had experience in the Alaska oil industry and knowledge of the North Slope's geology. They wanted to replicate the successes of the Eagle Ford shale and the Barnett shale in the Lower 48, where companies were drilling into source rock and using advances in hydraulic fracturing to extract hydrocarbons from geology once thought too tight to produce. "It's new to Alaska but it's not new to resource play exploitation in the Lower 48," Duncan said in 2010.

Hydrocarbons are created when organic materials deep within the earth encounter extreme temperatures and pressures. Once created, hydrocarbons migrate and accumulate based on their particular properties and also on the nature of different rock formations.

The process always leaves some oil behind, trapped in source rocks. Those rocks were once too tight to produce, but advances in well stimulation have made that oil viable.

The oil found in prolific North Slope fields like Prudhoe Bay and Kuparuk was presumably created elsewhere. Great Bear believed that "elsewhere" was the deep shale to the south. It believed it could launch 50 years of development by proving up its idea.

Early on, Great Bear was proposing a program unlike anything seen before in Alaska, and policymakers were both incredibly intrigued and incredibly skeptical with the claims.

The company envisioned three 15-year phases, each featuring

3,000 wells drilled from one-acre pads, with 200 wells to a pad. The program would require 20 rigs, drilling year-round. It would cost approximately \$2 billion each year, at a rate of \$10 million per well.

For comparison: at that time, only about 1,000 wells had been drilled in the main Prudhoe Bay field, throughput on the trans-Alaska oil pipeline was hovering around 550,000 barrels per day and the state usually only had between 20 and 30 rigs at any given time.

Why so many wells? Hydraulic fracturing is limited in its reach. It only produces oil contained in the thin fractures it creates. By comparison, the legacy oil fields of the North Slope are mostly conventional reservoirs — think: giant underground pools. With sufficient pressure, and accommodating geology, one well can drain a relatively large area.

The entire Alaska oil industry was developed around these conventional plays. For example, unitization is designed in part to protect correlative rights, making sure that one leaseholder doesn't surreptitiously drain away all the oil contained under a neighboring lease. What good is a unit when it comes to hundreds of thousands of oil-saturated rocks?

Great Bear also envisioned incredible rates of production: starting at 200,000 barrels per day by 2020 and reaching a peak of 600,000 barrels per day by 2056. The company even claimed it could produce 1 million barrels per day, simply by drilling more quickly.

If other players joined Great Bear in the region, Duncan told lawmakers in early 2011, the state might even need to build a second trans-Alaska oil pipeline to handle the flow.

Alcor and Merak

In pursuit of that goal, Great Bear proposed a six-well and lateral test program. The wells were named after the stars in the Ursa Major constellation, also known as the Great Bear: Alcor No. 1, Merak No. 1, Mizar No. 1, Megrez No. 1, Dubhe No. 1 and

Alioth No. 1.

The program began in the summer of 2012 — unusually for the Slope, Great Bear was able to take advantage of the road system to allow for some year-round exploration — when the company drilled the 10,812-foot Alcor 1 well and 11,094-foot Merak 1 well.

“I can tell you with absolute confidence that where we thought we would find oil in these source rocks, we found oil,” Duncan said in September 2012. Around the same time, he told a shale conference that the company would be producing oil by the end of the year.

But the challenge of source rock development is less in finding oil than in producing it commercially. By the end of the year, the company had only completed the vertical section of two wells and collected 600 feet of core but had not drilled the laterals.

“Certainly operations took a little bit longer than we expected, particularly on Alcor, and the lab analysis quite frankly has taken much longer than we had hoped,” Duncan said.

Great Bear plugged and abandoned both wells and spent several years evaluating its drilling results and conducting seismic. It returned to exploration in 2014-15, when it proposed a three-well program targeting conventional and unconventional resources.

The idea was to use near-term conventional production to generate cash flow that would finance the complexity of bringing unconventional development into a new basin.

In early 2015, Great Bear drilled the Alkaid 1 well. The well targeted the Kuparuk formation, but operations were ended before the entire Brookian had been penetrated.

Flooding along the Dalton Highway prevented the company

flow testing the Alkaid well that season. By the time the company suspended the well and demobilized equipment, all zones had been logged and sidewall cores had been taken at the deepest zones, confirming indications of oil in three major zones, from some 4,000 feet to 8,100 feet.

The company again turned to seismic acquisition, looking to bolster its understanding of a relatively underexplored and under-mapped section of the North Slope. But the suspension of exploration tax credits during the Walker administration prompted Great Bear Petroleum to further delay its exploration activities in the central North Slope.

Pantheon arrives

Pantheon Resources acquired two Great Bear subsidiaries in early 2019. The deal gave Pantheon a majority stake and operatorship of more than 250,000 acres of Great Bear leases, mostly located immediately south of the Prudhoe Bay and Kuparuk River units.

Pantheon announced plans to raise \$16 million plus expenses to help fund the acquisition and related exploration activities. While some of those funds would go toward existing exploration activities at its East Texas properties, most would go toward a suite of projects in Alaska. The goal of the program, the company said at a 2019 annual meeting, was “to prove up acreage ... and sell at a significant premium to a larger company.”

The Alaska projects included revisiting the Alkaid well and participating in the Winx No. 1 well on leases south of the Colville River unit and the village of Nuiqsut. Winx No. 1 was operated by 88 Energy Inc., profiled elsewhere in this edition of *The Explorers*.

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GREAT BEAR PANTHEON *continued from page 51*

In early statements, Pantheon said that its newly acquired acreage had “an estimated P50 technically recoverable resource (gross) of 2 billion barrels oil” in which \$200 million has been invested to date, including more than 1,000 square miles of 3D seismic. The acreage reportedly contained two discovery wells with six hydrocarbon-bearing zones.

Alkaid

The newly formed Great Bear Pantheon re-entered and flow tested Alkaid 1 in early 2019. The well produced 108 barrels of 38° API oil and 300 barrels of water over 24 hours from the Upper Brookian formation. The company estimated that the main zone of interest in the Brookian contained 240 feet of net pay within 400 feet of reservoir rock.

“Such flow rates are considered to be an excellent result and indicate the potential for materially higher flow rates when wells are drilled in the typical manner for Brookian wells in Alaska — horizontally, stimulated and with larger intervals perforated,” Pantheon said in a March 24, 2019, statement, referring to the vertical Alkaid No. 1 well.

Secondary targets in the West Sak and Ugnu formations were both wet.

The program also prompted the company to change its view of the nearby Phecda prospect. Instead of a separate venture, it now saw Phecda as an Alkaid appraisal well.

“These two projects will now likely be part of a single development plan, favorably located adjacent to the Dalton Highway and TAPS pipeline,” the company said. “The better than expected results in the zone of interest will also impact the pre-drill P50 technically recoverable resource estimates which will be assessed in the near future.”

In later announcements, Pantheon said that combining the prospect essentially doubled the P50 recoverable reserves — to a range of 90-135 million barrels, from 59 million barrels of oil. The estimated combined oil in place was increased 50% to 900 million barrels from 595 million barrels. The recovery factor also bumped up slightly.

The results prompted the company to review its pre-drill conceptual development plans at the Alkaid prospect and also to formulating plans for future farm out discussions.



COURTESY PAT GALVIN

Talitha at dusk.

By that summer, Pantheon was telling investors that it planned to implement a phased production program at Alkaid and could bring the field into production as early as 2021.

For the initial phase, the company said it would bring mobile production units to the area to process approximately 1,500 barrels of oil per day from three to four delineation wells and would then truck the oil north along the Dalton Highway to Pump Station No. 1 of the trans-Alaska oil pipeline. As the project advanced toward a full-scale development with as many as 50 wells, the company would construct a standalone processing facility.

While trucking oil year-round has occasionally been used as a short-term solution in Cook Inlet, it is nearly impossible across much of the North Slope due to the lack of permanent roads. The location of Alkaid along the Dalton Highway changed everything.

A month later, the company moved its timeline. Positive conversations with state and federal regulators had led the company to believe it could bring production online as soon as the summer of 2020, “subject to completion and timing of a successful farmout.”

Over the summer, Pantheon opened a data room and released investor updates designed to market the project, but neither successfully enticed a partner to join

the project.

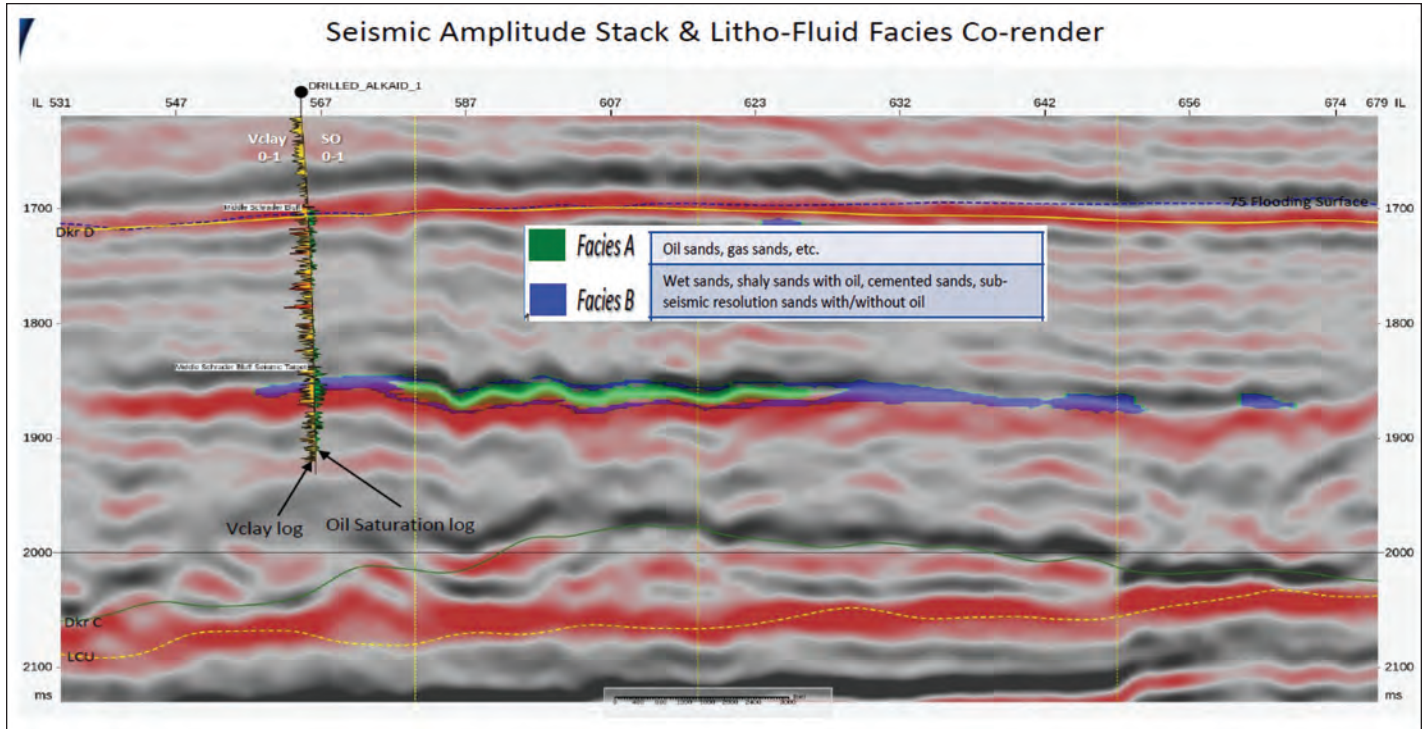
In October 2019, Pantheon announced it was buying out minority partners Halliburton Energy Services LLC and Red Technology Alliance LLC’s 25% interest in the six leases of the Alkaid/Phecda prospect. Pantheon said that the acquisition was important for improving ongoing farm-out discussions. But a potential partner remained elusive, especially given the epic uncertainty of 2020 — first the pandemic, then the price crash.

Talitha

The results of Alkaid also increased Pantheon’s confidence in the Talitha prospect.

Great Bear Pantheon drilled 10,456-foot Talitha No. A in January 2021 and reported oil shows and potentially productive zones in all five formations: the Kuparuk, Lower Basin Floor, Upper Basin Floor Fan sequences, Slope Fan and Shelf Margin Deltaic horizons.

In early 2019, around the time of the acquisition, Pantheon described the Talitha well as a re-drill of Pipeline State No. 1 from 1986. The Talitha well would appraise oil sands seen in the plugged and abandoned ARCO well and would also “test a topset exploration play analogous to recent major discoveries in the area” using techniques that “far surpass what was available in the 1980s.” The company



said that 900 million barrels of oil in place had been discovered in three zones and estimated 1.7 billion barrels of exploratory upside.

“ARCO drilled the well looking for a thick, clean sand and instead found a thick zone of interbedded, laminate-type sands and shale,” Pantheon Technical Director Bob Rosenthal said during a June 2019 webcast to share additional results. “The sands were oil-bearing but at the time given the ... \$10 price of oil and the fact completion technology wasn’t as advanced as it is today, the well was plugged and abandoned. ... With today’s horizontal drilling technology we believe we have a significant discovery” at the Talitha prospect.

Early results led the company to shift its approach. Initially, it had prioritized the Shelf Margin Deltaic. But instead the company is looking at a secondary target in the Kuparuk.

After attempting to test the well from the open well bore, Pantheon drilled a sidetrack approximately 80 feet from the original wellbore and perforated the sidetrack between 10,069 feet and 10,085 feet measured depth. The sidetrack encountered significantly higher than expected reservoir pressure and collected “exceptionally light oil.” The results promoted the company to consider “a more methodical approach to ongoing operations,” the company reported in a six-month financial report released March 30.

“Fracking and testing operations are now underway,” the company reported.

Work plans

The state Division of Oil and Gas formed the Talitha unit in late 2020 based on the potential of the Kuparuk C and Brookian formations. Both formations are conventional. They are the same formations that host many of the large producing fields to the north.

In its first plan of exploration, Great Bear Pantheon proposed drilling the Talitha A well in early 2021 and the Talitha B well in early 2022, as well as some seismic reprocessing.

Given the lack of exploration in the unit, the state required Great Bear Pantheon to post a \$3.3 million performance bond by September 2021. Failure to post the bond would result in automatic termination of the unit. To recover the bond, the company would need to drill a well within two years, or two wells within four years, of the formation of the unit.

The state also approved the neighboring Alkaid unit to the north of Talitha.

The accompanying Plan of Exploration proposed an 8,000-foot Alkaid No. 2 well to the bottom of the Brookian formation with a 10,000-foot lateral to the southwest. The project would begin with infrastructure construction in June 2021 with drilling to follow.

The company intends to conduct a long-term flow test of the Alkaid No. 2 well over a six-month to nine-month period starting September 2022. The flow test would be designed to establish the initial production rate, the slope of the decline curve and the rate at which the decline curve levels off in order to accurately predict the production tail.

Great Bear Pantheon also intends to conduct non-drilling activities, including reprocessing some 50 square miles of merged seismic information collected between 2012 and 2016, as well as other modeling activities and engineering work to consider possibilities for connecting a future development to the trans-Alaska oil pipeline.

The company is also considering a potential Alkaid No. 3 well in 2022. The well would depend on the current non-drilling activities, as well as the results of Alkaid No. 2. As currently envisioned, it would be similar in depth and design to the Alkaid No. 2 well but with a lateral to the northeast. A similar long-term flow test would also be conducted.

A schedule included with the plan calls for starting construction of the Alkaid No. 3 well in early 2022 with the production test occurring over the second half of the year. ●

Contact Eric Lidji at ericlidji@mac.com

Early February ice road construction at noon.



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