ANWR lease sale on track for ’19: EOG eyeing Alaska North Slope

AMONG THE NEWS TIDBITS that dropped at the Alaska Oil and Gas Association’s May 30 annual conference was Interior’s Joe Balash saying the first ANWR 1002 lease sale was on track for later this year, a state official’s comment that EOG Resources was taking a close look at investing in North Slope leases, and BP’s treat — custom mini-containers of delicious Wild Scoops Prudhoe Pretzel ice cream!

Balash, assistant secretary of Land and Minerals Management, told attendees Interior is working on a final draft Slope leases, and BP’s treat — custom mini-containers of delicious Wild Scoops Prudhoe Pretzel ice cream!

Nutrien continues to work on re-starting Alaska fertilizer plant

Nutrien is continuing to work on re-opening its fertilizer facility on the Kenai Peninsula near Nikiski, its Alaska manager Fred Werth told Petroleum News June 3.

A long-term, affordable natural gas supply from the Cook Inlet basin is crucial to restarting the Kenai plant, north of the city of Kenai. When the facility ran at full capacity it employed 400 people. It closed in 2007 for lack of a reliable and reasonably priced supply of gas. “Gas price is our biggest challenge,” natural gas feedstock being the highest cost component in the manufacturing process,

AEX proposes to begin permitting process for one-pad Placer field, connect to Piikka or Mustang

On June 3, the Alaska Division of Oil and Gas released an application from ASRC Exploration to amend the North Slope Placer unit’s plan of development in order to start the permitting process that will bring the Placer oil field into production in 2022.

This second amendment to the amended third plan of development for the unit runs one year, starting Sept. 9.

The activities proposed in the application, once approved by the division, “will be conducted under the auspices of Alaska’s oil industry,” which includes the efforts of her department.

The Alaska Division of Natural Resources, the commissioner said, is using the recent major North Slope Brookian oil discoveries by explorers such as Armstrong, Repsol, Oil Search and ConocoPhillips to attract other oil companies to the region. Among other things, DNR is adding large blocks of land with complete seismic and well datasets to the upcoming areawide lease sales and working to decrease the timeline to bring a field online from seven to five years.

The world is watching Alaska and we heard that loud and clear in the last several months as we traveled,” Feige said, specifically mentioning time she, Dunleavy and staff spent at CERAWeek in March, and the mid-May Tudor Pickering & Holt Hotter ‘N Hell Conference on May 14 that she and fellow DNR employees participated in.

“Since CERAWeek we had four intensive days of back-to-back meetings with companies, with regular

BP, ExxonMobil each contributing $10M toward LNG certification

Lt. Gov. Kevin Meyer announced May 30 in Anchorage at the Alaska Oil and Gas Association’s annual conference that BP and ExxonMobil are each contributing up to $10 million toward getting the Alaska LNG project through Federal Energy Regulatory Commission certification.

Meyer said the Alaska Gasline Development Corp. estimates it will take another year and $30 million to obtain the FERC permit. He noted that in addition to making the financial commitment, the companies had already been providing subject-matter expertise in the permitting process and assisting with the ongoing economic analysis to determine whether the project can be made

Norwegian wealth fund ready to unload assets from 26 Canadian companies

Norway is on the verge of delivering a troubling message across the Atlantic to Canadian shores.

Under growing political pressure to scale back its offshore operations, Norway’s $1 trillion wealth fund, built from its offshore industry riches into the biggest of its kind in the world, is facing a drastic overhaul as it prepares to sell $7.5 billion in shares of 134 energy companies, including 26 Canadian names.

The target list includes two of Canada’s largest independent players, Canadian Natural Resources and Encana, but excludes Suncor Energy and Husky Energy, two companies that own refineries, although Cenovus Energy is on the list, even though it shares ownership of two U.S. refineries in partnership with Houston-based Phillips 66. Smaller Alberta-based producers such as Arc Resources, Crescent Point Energy and Whitecap Resources are also expected to feel the squeeze.

Diversification cited

Norway’s Finance Minister Siv Jensen defended what she described as a limited divestment on the grounds that, as a major crude-exporting nation, the country was too dependent on oil revenue and needed to restructure its assets.

By KAY CASHMAN

By GARY PARK
AOGCC OKs Prudhoe satellite rules changes

The Alaska Oil and Gas Conservation Commission has approved Prudhoe Bay satellite pool rules changes requested by operator BP Exploration (Alaska) Inc. “to bring conformity and consistency to the well testing requirements and pressure survey requirements” of satellite fields at Prudhoe, improving field management efficiency for BP and compliance oversight for the commission, the commission said in its administrative approval.

The changes were requested in October for the Midnight Sun, Aurora, Borealis, Polaris and Schrader Bluff oil pools; the commission approved rules changes May 29.

Well testing, required once a month for each Prudhoe well, was required at least twice a month during the first three months of production for satellites. BP told the commission that all the satellites are well established and the need for increased well testing in early production no longer exists. Elimination of the multiple-well-test requirement would also promote efficiency at the drill sites in Prudhoe which produce from more than one pool.

Another inconsistency was in required pressure surveys, with Aurora, Borealis, Orion and Polaris rules requiring an initial pressure survey in each new well before regular production begins, while reliable estimates of pressure can be obtained from the pore pressure survey fluid gradient study conducted prior to drilling each new wellbores and from reservoir response during drilling. There are also reservoir models in place and years of development in the Prudhoe pools, making collection of pressure survey data on new wellbores unnecessary for proper pool development.

With a uniform approach to reservoir pressure monitoring, more useful information available.

For the Aurora and Orion pools, the rules relate required pressure surveys to governmental sections in the pool, while pool rules for other satellite pools completed in the same formations do not have that requirement.

An annual proposed reservoir pressure survey program for each pool provides AOGCC with sufficient information. “At the minimum,” the commission’s order says, “AOGCC will collect at least one pressure survey per active representative area sufficient to ensure that an adequate reservoir pressure survey program is conducted in these pools.”

Also, changing Aurora pressure survey results requirements from quarterly to annually will bring that pool’s reporting requirements into conformance with the rest of the field.

The commission noted that the pool rules affected have administrative approval clauses allowing rules to be administratively amended “as long as the change does not promote waste or jeopardize correlative rights, it is based on sound engineering and geoscience principles, and will not result in an increased risk of fluid movement into freshwater. The AOGCC finds that these conditions are met and that the orders may be administratively amended.”

Petroleum News

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What’s the big attraction?

A. an Industry institutions B. Quality, accurate reporting C. attractive, readable design


Alaska’s source for oil and gas news

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Alaska North Slope crude oil and natural gas liquids production averaged 515,292 barrels per day in April, down 1.4%, 7,042 bpd, from a March average of 522,334 bpd. Crude averaged 460,075 bpd; NGLs averaged 55,216 bpd.

ANS production for April was down 3.6% from April 2018, when it averaged 534,415 bpd; 482,018 bpd of crude oil and 52,396 bpd of NGLs.

Production data reported here is from the Alaska Oil and Gas Conservation Commission, which provides volumes by field and well on a month-delay basis. NGLs are shown for fields where they are produced — Prudhoe Bay, Endicott and Northstar.

The largest month-over-month increase, both in barrels and in percentage, was at the Hilcorp Alaska-operated Milne Point field, which averaged 25,260 bpd in April, up 10.3%, 2,530 bpd, from a March average of 22,710 and up 17.7% from an April 2018 average of 21,457 bpd. Production at the Slope’s newest pad, Milne Point’s Moose Pad, came online in early April, with Hilcorp reporting an initial rate of 3,000 bpd from two wells.

Other North Slope fields with month-over-month production increases include Endicott, Nikaitchuq and Northstar.

Production at the Hilcorp-operated Endicott field increased marginally, averaging 7,328 bpd (6,443 bpd of crude and 885 bpd of NGLs), up 0.2%, 15 bpd, from an April 2018 average of 7,313 bpd (6,443 bpd of crude and 870 bpd of NGLs). The field was also up year-over-year, an increase of 11.1% from an April 2018 average of 6,594 bpd (5,979 bpd of crude and 615 bpd of NGLs).

Eni’s Nikaitchuq field averaged 16,877 bpd in April, up 2.1%, 350 bpd, from an April average of 16,527 bpd, but down 5.5% from an April 2018 average of 17,853 bpd.

The Hilcorp-operated Northstar field averaged 11,373 bpd in April (8,510 bpd of crude and 2,863 bpd of NGLs), up 2.2%, 239 bpd, from a March average of 11,133 bpd (8,200 bpd of crude and 2,933 bpd of NGLs), but down 1.1% from an April 2018 average of 11,493 bpd (8,770 bpd of crude and 2,723 bpd of NGLs).

Cook Inlet production increased marginally, averaging 15,397 bpd in April, up 0.4%, 68 bpd, from a March average of 15,329 bpd, and up 0.1% from an April 2018 average of 15,387 bpd.

In addition to the primary reservoir, production volumes from Prudhoe include Aurora, Borealis, Lisburne, Midnight Sun, Niukok, Polaris, Point McIntyre, Put River, Raven and Schrader Bluffs.

The month-over-month decline was small at ConocoPhillips Alaska’s Greater Mooses Tooth, which averaged 12,253 bpd in April, down 0.5%, 57 bpd, from a March average of 12,310 bpd. Greater Mooses Tooth, which is in the National Petroleum Reserve-Alaska, came online in October and is producing from three wells.

ConocoPhillips’ Colville River unit averaged 52,661 bpd in April, down 2.7%, 1,482 bpd, from a March average of 54,142 bpd, and down 20.2% from an April 2018 average of 66,001 bpd.

In addition to oil from the main Alpine pool, Colville production includes satellite production from Fiord, Nanuq and Qannik.

The ConocoPhillips-operated Kuparuk River field averaged 100,342 bpd in April, down 4.3%, 4,488 bpd, from an April average of 104,830, and down 9.1% from an April 2018 average of 110,323 bpd.

In addition to the main Kuparuk pool, Kuparuk produces from satellites at Melwater, Tabasco and Turn, and from West Sak.

Badami, operated by Glacier Oil & Gas subsidiary Savant Alaska, averaged 1,659 bpd in April, down 8.7%, 158 bpd, from an April average of 1,817 bpd, but up 137.7% from an April 2018 average of 698 bpd. Badami production increased beginning in May of 2018, when Savant brought the B1-07 well online, with field production peaking in January at 2,133 bpd.

Eni’s Oooguruk field averaged 6,645 bpd in April, down 16.1%, 1,267 bpd, from an April average of 7,912 bpd, and down 21.3% from an April 2018 average of 8,459 bpd. Eni acquired the 70% of the field it did not already own, and operatorship, in January from Caelus Alaska.

The ExxonMobil Production-operated Point Thomson field averaged 8,027 bpd in April, down 17%, 1,467 bpd, from a March average of 9,664 bpd, but up 152.8% from an April 2018 average of 3,175 bpd. Volumes fluctuated as ExxonMobil addressed compressor issues but had largely stabilized since the field came back online in October after a three-month period when it was offline for maintenance.

Cook Inlet

Cook Inlet production averaged 15,397 bpd in April, up 0.4%, 68 bpd, from a March average of 15,329 bpd, and up 0.1% from an April 2018 average of 15,387 bpd.

Hilcorp’s Beaver Creek field, Cook Inlet’s smallest oil field, averaged 417 bpd in April, up 22.4%, 76 bpd, from a March average of 341 bpd and up 363.9% from an April 2018 average of 90 bpd. Hilcorp completed a re-drill at the field in November, kicking production up in that month to 904 bpd from an October average of 71 bpd.

Hilcorp’s Granite Point field averaged 2,586 bpd in April, down 4.7%, 126 bpd, from a March average of 2,714, and down 7.2% from an April 2018 average of 2,788 bpd.

BlueCrest’s Hansen field, the Cosmosproject project, averaged 1,668 bpd in April, up 6.6%, 106 bpd, from a March average of 1,562 bpd, and up 123.3% from an April 2018 average of 747 bpd. The field was producing from two wells last April; this April AOGCC data show five wells in production.

Hilcorp’s McArthur River field, Cook Inlet’s largest, averaged 4,912 bpd in April, up 0.2%, 9 bpd, from a March average of 4,903 bpd and up 3% from an April 2018 average of 4,678 bpd.

Middle Ground Shoal, also a Hilcorp field, averaged 1,321 bpd in April, down 6.1%, 86 bpd, from a March average of 1,408 bpd and down 10.2% from an April 2018 average of 1,472 bpd.

Redoubt Shool, operated by Glacier Oil & Gas subsidiary Cook Inlet Energy, averaged 1,231 bpd in April, down 2%, 25 bpd, from a March average of 1,256 bpd and down 9.9% from an April 2018 average of 1,367 bpd.

Hilcorp’s Swanson River field averaged 1,072 bpd in April, down 2.9%, 32 bpd, from a March average of 1,104 bpd and down 26.5% from an April 2018 average of 1,458 bpd.

Hilcorp’s Trading Bay field averaged 1,615 bpd in April, up 10.4%, 152 bpd, from a March average of 1,462, but down 7.9% from an April 2018 average of 1,754 bpd.

The West McArthur River field, operated by Glacier Oil & Gas subsidiary Cook Inlet Energy, averaged 575 bpd in April, down 0.6%, 3 bpd, from a March average of 579 bpd and down 44.3% from an April 2018 average of 1,032 bpd.

ANS crude oil production peaked in 1988 at 2.1 million bpd; Cook Inlet crude oil production peaked in 1970 at more than 227,000 bpd. ■
EXPLORE & PRODUCTION

Conoco Phillips says it drilled eight exploration and appraisal wells on the North Slope during this past winter’s off-road drilling season and tested six of those. The Alaska Oil and Gas Conservation Commission (and therefore Petroleum News) classifies all the wells as exploratory.

The two wells that were not tested was “due to end of winter season timing constraints,” company spokeswoman Natalie Lowman told Petroleum News June 3. Interestingly, AOGCC shows a total of 11 exploration wells drilled this past winter by the company; completed between November and the end of the winter season in early May, with the first well in the Colville River unit’s Putu prospect from drillsite CD-4. That well was mentioned by ConocoPhillips Chairman and CEO Ryan Lance in an earnings strategy presentation last year.

When asked how soon well results would be released, Lowman said, “We will be evaluating results of the exploration season in the coming months. This winter we drilled eight exploration wells (two re-entries). . . . We also laid gravel for the GMT2 drilling pad.”

Last winter seven wells

In last winter’s off-road season, ConocoPhillips conducted the largest exploration season on the North Slope to that point since 2002. The company said four wells of its seven wells were drilled in and near ConocoPhillips’ behemoth Willow discovery at the western end of its recent finds and one slant and vertical well at the Putu prospect, directly south of the Colville River unit.

A well was also drilled at the Stony Hill prospect, straight south of Putu 2. The Putu wells successfully targeted two distinctive seismic amplitude anomalies, Scott Jepsen, ConocoPhillips Alaska vice president, said in September. There was a third anomaly in the Putu prospect, he said, immediately west of the two tested anomalies — that anomaly was drilled this winter from CD-4.

By KRISTEN NELSON
Petroleum News

Brooks Range seeks AOGCC injection order

Company tells commission work based on Kuparuk River order; provides for wastewater, initial natural gas to be used as fuel gas

Brooks Range Petroleum Corp. is seeking an area injection order for the Southern Miluveach unit, Kuparuk River oil pool, from the Alaska Oil and Gas Conservation Commission. Lawrence Vendl, Brooks Range exploration and subsurface development manager, told Commissioners Jessie Chmielowski and Dan Seamount at a June 4 hearing that the company seeks authorization to inject fluids for pressure maintenance and enhanced recovery of hydrocarbons in the Southern Miluveach unit.

Vendl said Brooks Range is working under Kuparuk River pool rules under the assumption that Southern Miluveach is part of the Kuparuk River pool. The area now included in Southern Miluveach, which lies southwest of the Kuparuk River unit, was part of the Kuparuk River unit in the 1980s when that unit was formed.

The Kuparuk oil pool within the SMU is a continuation of Kuparuk C and A sands in the Kuparuk River unit, Vendl said, and lies between minus 5,800 feet true vertical depth subsea and minus 6,400 feet TVDSS.

He said development of the Kuparuk oil pool within the SMU will be done in discrete phases to mitigate risk and improve recovery, with targets accessed from the SMU Mustang drill site.

Temporary facility

Brooks Range had originally planned to start up the field with permanent production facilities capable of handling 15,000 barrels per day of oil, but due to uncertain oil prices the company decided to begin with a small temporary facility, gradually scaling up production. Reservoir targets will be accessed from the Mustang drill site, with current plans to develop the field with up to 11 horizontal producers and up to 10 horizontal injectors, with the possibility of hydraulically fracturing some of the producers.

Production will be from both C and A Kuparuk sands; wastewater is planned, followed eventually by lean or miscible gas flood.

Water for wastewater will be produced water from the field and seawater from the ConocoPhillips seawater pipeline, with gas to be sourced from SMU processing facilities.

Brooks Range has drilled two wells in the SMU; North Test 1A and SMU N4-02, and both will be used long term for injection.

Vendl said audited Kuparuk reserves for the SMU are 21.2 million barrels of 1P (proven oil in place). Presentation materials at the hearing also showed 2P at 32.8 million barrels 2P (probable) and 3P at 38.3 million barrels (possible), and showed primary recovery as estimated at 10-15% of original oil in place with waterflood adding 10-25%, for a total recovery after waterflood of up to 35%.

Vendl cited an average estimated recovery rate of 30% with wastewater, expected to rise to 40% with tertiary recovery.

Facilities work underway

Considerable onsite facilities work at SMU has been done — roads and pads for the project were completed in 2013 and most of the above-ground pipeline systems were installed in early 2015.

Bart Armfield, president and CEO of BRPC, told the board of the Alaska Industrial Development and Export Authority this April that pipelines were being installed — a line for exporting oil and a line to bring in seawater for injection in the future.

The oil line will connect to the Alpine line. Armfield also said remote electrical and instrumentation had been installed on

see INJECTION ORDER page 8
Cheers Oil Search and Repsol on receiving the U.S. Army Corps of Engineers Record of Decision and permit for your North Slope Pikka development. Once the 120,000-barrel-a-day facility is online, it will represent the first significant amount of Nanushuk formation oil delivered to the trans-Alaska pipeline.

Keiran Wulff
BlueCrest adds gas equipment at Cosmo

On May 31, the Alaska Department of Natural Resources, Division of Oil and Gas, approved BlueCrest Alaska Operating’s application to install and operate a gas processing unit at the company’s onshore Cosmopolitan Production Facility on the Kenai Peninsula.

“This is simply an expansion to the original equipment in our production facility. Some of our oil zones produce more natural gas than expected in the original field design, and this new equipment will allow us to process the larger volumes of gas associated with the oil production as we grow,” J. Benjamin Johnson, BlueCrest director, told Petroleum News in a June 4 email.

The division’s approval letter to Larry Burgess, the company’s Alaska manager, said the scope of the activities as proposed in the Cosmopolitan lease plan of operations amendment were to “install and operate a gas processing unit” at the production facility on the Hansen Pad, including “a mechanical refrigeration unit and related infrastructure.”

BlueCrest brought the southern Cook Inlet unit into production in 2016 and is using state-of-the-art extended-reach drilling technology and a custom-built drilling rig to access the offshore oil reserves from the onshore drill site and production facility.

The oil wells, which produce some associated natural gas, are being drilled about 3 miles out and 1.5 miles down to reach the edge of the reservoir. Then the wells navigate an additional 1.5 miles horizontally through the productive sands.

Of the 15 wells completed in the field in 2018, 13 were sidetracks, part of BlueCrest’s innovative development strategy of utilizing a “fishbone” well pattern, with a single “spine” well running from the surface. That spine well is deviationed to run through the lower part of the oil reservoir, with sidetrack “rib” wells drilled upwards every 800 feet into reservoir rock above the spine.

BlueCrest has increased Cosmopolitan oil production from 275 barrels of oil per day in July 2017 to 1,562 bpd in March.

—KAY CASHMAN

INSIDER continued from page 1

EOG checking out North Slope

A STATE OFFICIAL AT THE ANNUAL AOGA conference May 30 said Houston-based EOG Resources is taking a serious look at investing in Alaska’s North Slope.

With a market capitalization of approximately $70 billion, EOG is right behind ConocoPhillips in market cap and often exceeds Conoco in oil production, with Chevron and ExxonMobil at the top of that list of U.S. oil and gas companies.

EOG is an innovative and aggressive explorer and developer, and always open to new opportunities. EOG was reportedly one of three companies that called Alaska Department of Natural Resources Commissioner Corni Feige after she touted the northernmost state at the 15th annual Tudor Pickering & Holt Hott ‘N Hell Conference in Houston on May 14.

EOG and its subsidiaries explore for, develop, produce and market crude oil and natural gas. Their principal producing areas are New Mexico, North Dakota, Texas, Utah and Wyoming in the United States, as well as the Republic of Trinidad and Tobago, the People’s Republic of China and Canada outside the U.S.

Finally—and totally unrelated—according to a May 2 stock reporting service, large investors recently bought and sold shares of EOG, including what they called the Alaska Department of Revenue (must mean the Alaska Permanent Fund Corp.), which increased its stake in EOG by 2.9% during the fourth quarter. APFC “now owns 88,860 shares of the energy exploration company’s stock valued at $7,747,080 after purchasing an additional 2,469 shares during the last quarter. Hedge funds and other institutional investors own 86.81% of the company’s stock,” the reporting service said.

—KAY CASHMAN

With a market capitalization of approximately $70 billion, EOG is right behind ConocoPhillips in market cap and often exceeds Conoco in oil production, with Chevron and ExxonMobil at the top of that list of U.S. oil and gas companies.
New technologies for Alaska geology

Automated scanning system analyzes and logs fine-scale rock properties of the Nanushuk — merged with wire logs, published data

By STEVE SUTHERLIN
For Petroleum News

The future is now” was the unspoken theme at a May 31 technical breakout session in Anchorage at the state Geologic Materials Center focused on the potential for new investigative technologies and machine learning systems to better assist geologists and resource companies to meet the challenges of interpreting Alaska geology.

Dr. Ramil Ahmadov, principal scientist, New England Research Inc., spoke on the use of his company’s automated scanning system — AutoScan — to analyze fine-scale rock properties and automatically log rock properties in the Nanushuk formation of the North Slope.

“Using a fast, nondestructive and relatively cheap and not real labor intensive system, we can acquire a lot of data and that data could be mined or as we call it, massaged, and some useful things might come out of it that we can then use in propagating a system that actually mimics the reservoir conditions,” Ahmadov said.

AutoScan is an integrated system for scanning slabbed core, whole core, or core plugs for gas permeability, resistivity, ultrasonic compressional and shear-wave velocities, composition, mechanical strength, and elastic stiffness, according to NER.

Ahmadov and his co-author Gregory N. Botnott scanned a 40-foot slabbed core section from the 760-foot level to the 797.9-foot level of the Umiat 18 well, in preparation of their report, “Non-Destructive Automated Scanning of Fine-Scale Geological, Petrophysical and Geomechanical Rock Properties of Nanushuk Formation.”

“AutoScan, the name misrepresents the actual outcomes because usually when people think or hear scan, they think about CT scanning or some other scanning where you are actually not measuring the direct rock properties,” Ahmadov said, adding that 90% of the device’s outcomes or measurements are actual physical property measurements.

“It works with all sorts of core from regular or irregular shaped core sidewall rotary slots, lap core, whole core, even sometimes cuttings if they’re competent enough, and what the system provides is a number of different physical property measurements down to millimeter scale,” he said.

AutoScan shines in a trio of functions, Ahmadov said: rock typing; an ability to measure, and mechanical properties (Young’s modulus),” according to the report abstract. “The measurements were then compared and complemented to with more conventionally derived triple-combo (gamma ray, density, and resistivity (wireline logging) measurements.”

After obtaining FTIR (Fourier-transform infrared spectroscopy), velocity data, and permeability, the FTIR is subdivide into four categories indicating clay, carbonates, silicates, and oil signature — which is basically staining of the material, Ahmadov said. As to velocity, Vp and Vs are obtained to use the two in combination as a Vp/Vs ratio (ratio of compressional wave velocity to shear wave velocity).

“We round these measurements at a 5-millimeter resolution so we’ve got about 2400 measurements of each of these different properties on a 40-foot section of Nanushuk core that was sectioned from the 760-foot level to the 797.9-foot level of the Umiat 18 well, in preparation of their report, “Non-Destructive Automated Scanning of Fine-Scale Geological, Petrophysical and Geomechanical Rock Properties of Nanushuk Formation.”

AutoScan — system for physical property measurement of well core
continued from page 7

NEW TECHNOLOGIES
interval,” he said.

Finally the data from the auto scan is analyzed and merged with the published data and the wireline logs from the Umat 18 well — “which had that triple combo data.”

Using the color-coded display of the core interval from the combined data, Ahmadov was able to show a transition between the shale dominated to some-

between sandstones and shales,” he said.

By density again, we have the differential straightforward petrophysical plots here, porosity, Ahmadov could differentiate not

is isolated a 9-foot core interval.

“From the other perspective again very straightforward petrophysical plots here, gamma ray versus resistivity color coded by density again, we have the differential between sandstones and shales,” he said.

“We now try to bring data from the AutoScan onto this particular interval, we’re looking at the oil indicator so any-

thing here above five would indicate strong staining of the core — it can differen-
tiate your reservoirs from your non-

reservoirs and this is color coded by the clay.”

Later in the presentation, Ahmadov isolated a 9-foot core interval.

“If you were to draw conclusions from the wireline logs, in that 9-foot interval you would be confined to about 18 meas-

urements and how much value you can add from 18 measurements from wireline and log data is questionable,” he said.

“The corresponding AutoScan data has hundreds of different points,” he said.

“The message here is that just within that 9-foot interval, if you were to use the AutoScan data you can differentiate in terms of the lithology as a function of the permeability for all that data and you’ll figure out that there are more than two orders of variation over a 9-foot interval and almost 50 times variation in elastic properties over the same interval.”

Contact Steve Satherlin
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EXPLORATION & PRODUCTION
US drilling rig count up by one to 984

The number of rigs drilling for oil and natural gas in the U.S. was up by one the week ending May 31 to 984.

A year ago, the count was 1,060 active rigs.

Houston oilfield services company Baker Hughes reported that 800 rigs targeted oil (up three from the previous week) and 184 targeted natural gas (down two).

The company said 70 of the U.S. holes were directional, 862 were horizontal and 52 were vertical.

The New Mexico rig count was up two from the previous week; Louisiana was up by one rig.

The rig counts for a number of states were unchanged from the previous week: Alaska, California, Colorado, North Dakota, Pennsylvania and Wyoming.

Ohio, Oklahoma, Texas and West Virginia were each down by one rig.

Texas, at 480, has the most active rigs in the country.

Baker Hughes shows Alaska with seven active rigs, compared to nine a year ago.

The U.S. rig count peaked at 4,530 in 1981. It bottomed out in May 2016 at 404.

—PETROLEUM NEWS

continued from page 1

LNG CONTRIBUTIONS
more competitive.

“This is a welcome announcement and an important step for the Alaska LNG project, as they can now have con-

fidence they have the resources to com-

plete the FERC process,” U.S. Sen. Lisa Murkowski, R-Alaska, said in a June 3 statement.

When BP and ExxonMobil signed a collaboration agreement with AGDC ear-

lier in the year, AGDC said the agree-

ment was “to collaborate on ways to advance the Alaska LNG project by working together to identify ways to

improve the project’s competitiveness, and progress both the Federal Energy Regulatory Commission authorization to

construct the project.”

BP and ExxonMobil previously signed gas sales precedent agreements with AGDC — BP in May 2018 and ExxonMobil in September — but until the collaboration agreement they had not been directly involved since the state took over the Alaska LNG project in 2016.

“Our respective organizations share an interest in the successful commercial-

ization of Alaska’s stranded North Slope natural gas. BP and ExxonMobil possess world-class LNG expertise which may help AGDC responsibly advance this project with maximum efficiency for the benefit of Alaskans, and I welcome their collaboration,” AGDC Interim President Joe Dubler said in a March statement announcing the collaboration agreement.

Later in March, Dubler told legislators in an update to the House and Senate Resources committees that both technical and commercial issues would be reviewed under the collaboration agreement.

A technical meeting was scheduled

for Houston in early April, he said, with the goal of lowering the total installed cost of the project.

At an AGDC board meeting in May, Frank Richards, AGDC senior vice pres-

ident of program management, said the goal of the April workshop was cost reduction, because the latest cost estimate for the project was based on 2015 num-

bers. He said the workshop looked at new market conditions, technology advance-

ments — opportunities for cost reduc-

tion. Richards called out the output of the three-day workshop positive, with multi-

ple engineers from each organization attending, along with a commercial per-

son from each group.

AGDC changed direction after Mike Dunleavy was elected governor, with the two new commissioners from the new administration and the replacement of two public members of the board by Dunleavy. The board then reconvened, dismissed the previous president of AGDC, Keith Meyer, and named Dubler interim president.

The project also returned to a stage-

gate process, where the opportunity to go forward or not occurs at predetermined points, with 2012 a stagelate when BP, ConocoPhillips and ExxonMobil, then partnered with the state in the project, determined they did not wish to continue, and the state, under then-Gov. Bill Walker, continued with the project on its own.

—KRISTEN NELSON

INJECTION ORDER

the field’s gravel pad and electrical work, testing and other work was in progress.

Production is planned to start at about 1,000 barrels per day, Armfield told the board, using a single well that the com-

pany flow tested in 2017. Then a 6,000-

foot lateral will be drilled from a partial-

ly completed well at the field, bringing an additional 2,000 to 3,000 bpd online.

Another two wells should bring total pro-
duction to about 6,000 bpd, with eventual total field development in some 17 injec-

tion and production wells.

Brooks Range is also seeking an

aquifer exemption — a ruling that there are no freshwater aquifers within the development area of the SMU. Vendell said SMU was part of a 1984 aquifer exemption from the Environmental Protection Agency for the Kuparuk River unit, but said EPA no longer rec-

ognizes the exemption for SMU since the area was contracted out of the Kuparuk River unit.

He said Brooks Range is getting a saline evaluation of formation water in the area but told the commissioners no freshwater aquifers are found within the SMU development area.

Contact Kristen Nelson
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Wolfpack Land Company is Offering 4,761 Acres of Prime Mineral Interest Ownership in the Kenai, Alaska Area for Oil and Gas Leasing

Beaver Loop Road Area

Township 5 North, Range 11 West (Surveyed)
Section 1, Lots 6-8, 10, 14, S1/2NE1/4, N1/2SE1/4, NE1/4SW1/4;
Section 2, Lots 3 and 6, S1/2NW1/4;
Section 11, Lots 1, 8, 9, W1/2NE1/4, NW1/4SE1/4, NE1/4SW1/4;
Section 12, Lots 1-13, NE1/4SW1/4, SE1/4NE1/4, NW1/4SE1/4.  
Containing 1,063.51 acres, more or less.

Township 6 North, Range 10 West (Surveyed)
Section 29, SW1/4, S1/2NW1/4
Section 30, Lots 3 & 4, E1/2SW1/4, SE1/4, S1/2NE1/4
Section 31, Lots 1 & 2, NE1/4NW1/4NE1/4
Section 32, NW1/4NW1/4
Containing 947.98 acres, more or less.

Township 6 North, Range 11 West (Surveyed)
Section 25, E1/2SE1/4, E1/2SW1/4SE1/4
Section 35, NE1/4NE1/4, N1/2S1/2NE1/4, N1/2S1/2SE1/4, SE1/4NW1/4, E1/2SW1/4SW1/4, E1/2SW1/4SW1/4, W1/2SW1/4SW1/4SW1/4, SE1/4SW1/4, S1/2NE1/4, S1/2NW1/2SE1/4, S1/2NW1/2SE1/4.
Section 36, All
Containing 1,105 acres, more or less.

Aggregating 3,116.49 acres, more or less.

Robinson Loop Road Area

Township 5 North, Range 9 West (Surveyed)
Section 6, Lots 2, 3, S1/2NE1/4, E1/2SW1/4, SE1/4;
Section 7, Lots 1, 2, E1/2NW1/4, NE1/4, NE1/4SE1/4;
Section 8, W1/2NE1/4, NW1/4SW1/4.  
Containing 926.23 acres, more or less.

Township 5 North, Range 10 West (surveyed)
Section 1, Lots 1, 2, S1/2NE1/4, SE1/4;
Section 12, E1/2, E1/2NW1/4.
Containing 718.96 acres, more or less.

Aggregating 1,645.19 acres, more or less.

These fee mineral rights have significant known hydrocarbons on or very near them. This prospect is not in a remote area. Everything is road accessible, winter and summer, with easy access to oilfield suppliers. Seismic data available.

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For more details contact Wolfpack Land Company, Houston, Texas, at jim5thgn@outlook.com, jim@applecapital.net, or (907) 394-9148.
AEX PERMITTING
continued from page 1

WEALTH FUND
continued from page 1

the existing Placer #3 well plan of operations,” the compa-
ny said, which includes flow testing the Placer No. 3 well.

Connect to Pikka or Mustang

AEX, which recently placed Placer on the market (see June 2 issue of Petroleum News), said it had identified a single pad for development and two transportation options.

The first option was a road and pipeline to Nanushuk (Pikka unit) drilledite 1 with a tie-in to the Nanushuk central processing facilities. That development is scheduled to come online at the end of 2023 under the operatorship of Oil Search.

The second option proposed by AEX was a road and pipeline to the soon-to-be in production Mustang central processing facilities for the Miluveach oil field, operated by Brooks Range Petroleum.

AEX said it was planning to conduct fieldwork on pads, routes and other required studies in August as part of the development project and permitting process. The company planned to coordinate with the U.S. Army Corps of Engineer to “identify and assure that all required data is gathered during the 2019 summer field season.”

AEX said, depending on the weather, it would con-
duct and accomplish the following during the summer:
• Wetlands verification and delineation at drilledite and along route options extending to 500 feet on either side of each route.
• Cultural resources field survey at drilledite and along route options extending to 500 feet on either side of each route.
• Fish surveys for Miluveach River and small stream crossings.
• Nesting surveys for waterfowl within the area.
• Hydrologic studies for Miluveach River to identify appropriate location for bridge crossing.
• Identify lakes within project option area that may require lake surveys.
• Analysis of 100- and 500-year flood events relative to drillsite and pipeline locations.
• Evaluate project footprint and a 1-mile Miluveach River buffer.

The application was signed by AEX President Teresa Inmm.

Kuparuk, Nanushuk and Alpine

According to the firm conducting the sale of Placer, the 8,768-acre unit’s stacked plays include the Kuparuk C reservoir and the potential for additional stacked pays in the Nanushuk and Alpine intervals.

Place, the sales advertisements said, could have 110 million barrels of original oil in place, with between 35 million and 45 million barrels of oil recoverable across all horizons. They said Placer was in a good neighbor-
hood with the ConocoPhillips’ Kuparuk River oil field on the east and bordering the Oil Search Pikka unit on the west.

—KAY CASHMAN

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Drilling Targets

The resultant maps and database show the drilling targets categorized by type for 584 exploration wells on the North Slope, Beaufort Sea and Chukchi Sea. It is designed to be a resource for explorers. The discovery well and production data for each producing pool are integrated into the study to address explorers’ questions.

Exploration target data are solely from public sources. The team did not use protective information from wells that are held confidential by the state, Gregersen said. “When we pulled all of this together we took those objectives and we categorized them,” she said. “When you look at the history and you combine that with mapping things you can see regional geologic trends.”

Wells have targeted five main stratigraphic play groups: Ellesmerian clastics and carbonates (Kekiktuk, Lisburne, Ivishak, Shublik, and Sag River), Jurassic shorface sands (Barrow, Simpson, Kugrua, Nechelit, Nuiquit, and Alpine), Cretaceous rift sands (Walakia, Kuparuk River, Kenik, and Thomson), Brookian turbidites (Torkor, Seabee, and Canning) and Brookian turbidites (Natuniq, Taluluk, Snodgrass Bluff, Placer, Hunkpapa, Prince Creek, and Sagavanirktok). A sixth category called “Other” includes the remaining targets (e.g., basement, methane hydrates, and gas hydrates).

The division has released a series of maps based on the project data, which can be downloaded on its website.

In addition to a North Slope overview map exploration drilling targets of all play types, exploration drilling targets are also mapped in three major categories: Ellesmerian, Beaufortian, and Brookian.

The map of Ellesmerian exploration drilling targets includes the Kekiktuk Formation, Lisburne Group, Shublik Group, and Sag River Sandstone.

The Brookian Exploration Drilling Drilling targets map includes the Jurassic shorface and the Cretaceous rift.

The map of Brookian exploration drilling targets features the Brookian turbidite and Brookian topset plays.

The maps are accompanied by a database of exploration and targeting categories by play type, on Excel software, which also can be downloaded from the division’s website, as well as a slide sequence from Gregersen’s presentation.

Exploration Inferences

“Exploration was influenced by multiple things — land availability, pipeline access and key oil discoveries that influenced operator behavior,” Gregersen said.

“The story begins in 1960’s the state of Alaska wasn’t a state yet, we were still a territory and we were in World War II at that time,” she said. “The federal government decided that north Alaska was no longer available for public entry so only the U.S. Navy was drilling wells at that time. The federal government had three periods of active exploration drilling in the 1970s, 1980s, and 1990s; the mid-1970s to the early 1980s; and then also from 2007 to 2009, focused on the North Slope Petroleum Reserve-Alaska and the nearby region, she said.

“Luckily for the state the oil was discovered in Cook Inlet in 1957, which led to the first federal lease sale in our state and the first lease sale in 1964 — that the state held, she said. “In 1968 Prudhoe was discovered, and in the following year we had much more exploration than any other year in north Alaska.

“Prudhoe produced over 12 billion barrels to date, and the flowing year many discoveries were made — one of which is Kuparuk River which has produced over 2 billion barrels.”

Discoveries rolled in, but a way to market was needed.

“Even though these big discoveries were occurring in the late 1980s, there had been no approval to construct the oil pipeline,” she said. “Lucky in 1973, it took a world event to make that happen, it took four years, then we had oil going down the pipeline.”

Growing land availability was a factor as well, boosting the pace of exploration drilling.

“We started to have access to our lands offshore, NPR-A became available, and the first OCS sale,” she said. “There have been multiple lease sales between then and now, and in 1999 the state of Alaska started offering our areawide lease sales, which we do every year; we offer available lands in north Alaska for people to lease.”

Most North Slope drilling activity has been along the Barrow Arch, which has been the focus area which the hydrocarbons have migrated to,” she said. In the first of the play categories, the Ellesmerian, “you have a series of non-marine to marine clastics, then you have carbonates or deposits in the Mississippian and Permian time frames,” she said. Sediments containing petroleum were deposited on the south facing slopes, and at that time the shelf was relatively stable.

The second category, Jurassic shorface is “represented by the beginning of the Barrow Arch starting to rise because of lifting and opening of the Arctic Ocean,” she said. The third category, “Cretaceous rift sediment are also deposited during this time, with the continued lifting and opening of the Arctic Ocean.”

“The fourth and fifth targets are the Brookian peroxities and Brookian turbidites,” she said. “You can see the turbidites are the toe slope prodelta deposits, and your topset including non-marine to shallow marine to delftic deposits.”

She said 74% of 18 billion North Slope barrels that have been produced to date have come from the Ellesmerian, 28% has come from Cretaceous rift deposits or reservoirs, 2% came from Brookian topset, 1% from Brookian turbidites, and 3% from the Jurassic shorface.

The production makeup is evolving, she said. In 2018, of 187 million barrels produced, 48% came from the Ellesmerian, 20% came from the Cretaceous rift, Brookian topsets represented 12% of production, Jurassic 16%, and Brookian turbidites were 2% of North Slope production.

Discoveries beget exploration.

Significant discoveries in each play type have led to a flurry of drilling activity, Gregersen said.

Most of the early fields that were discovered were nearby Prudhoe Bay and there were two gas fields located in the foothills. In the late 70s to mid-80s you had discoveries in the Beaufort Sea.

Exploration activity targeting the Ellesmerian was greatest after the discovery of Prudhoe Bay in 1968 and continued at an elevated rate through 1996.

The Ellesmerian targeting map reaches “far and wide; the Ellesmerian has been targeted by folks trying to find other Prudhoe Basins,” she said. The Saibroch was the most targeted play in the Ellesmerian, the Lisburne was targeted along the Barrow Arch, and in NPR-A multiple wells in the footwall targeted Lisburne strucps.

Many plays have been known, but not developed for years.

The Jurassic shorface was the target in 1940s and 1950s by the U.S. Navy, with first production in the 1980s and 1990s. The Jurassic formation has produced up to 120,000 bpd.

After the giant Alaskan field was discovered in 1944, the delineation going to the west occurred. Jurassic exploration continued from 1992 to 2015, spurred by the Alpine discovery.

Gas was discovered in the 1940s and the 1970s within the Colville Delta. The Nikaitchuq was active from 1985. Gregersen said, “It was known about but there wasn’t room for it (in the pipeline) so the exploration continued on.”

“Greater Mooses Tooth Alpine was discovered in 2002, that is why I came up with Anadarko in the winter of 2001/2002,” Gregersen said. “It took a long time for development to happen so I’m happy about that — and happy to see that the Pikka has also discovered Jurassic (oil) in 2014.”

The late 1960s to mid-1990s found discoveries of gas and oil at Point Thomson, and around the Prudhoe discovery, Gregersen said. In the late 1980s to early 1990s oil was found in many existing units. The Burger acquisition was discovered in 1990 — another OCS discovery that has not been developed.

Cretaceous rift sands have regularly been a drilling target since the Kuparuk River field was discovered in 1969.

“Most targets are Kuparuk, but if you want to think back in time about what was going on, this is the subcrop under the LCU, and you can see that the Barrow Arch was rising and the sediments were coming off of the Barrow Arch and being deposited,” she said. “The recent discovery — still undeveloped — of Placer and Mustang are within the crenate group target.”

Brookian topsets and turbidites were the earliest targets starting in the 1940s with spikes in exploration activity in every decade since 1964.

“Many discoveries by the U.S. Navy in the 40s and 50s, and more wells targeted the Brookian at that time,” Gregersen said. “There were peaks in the 60s and 70s in the 80s, and after the discovery of Nikaitchuq by Kerr McGee there was increased drilling effort by multiple companies in that region looking for a topset trend.”

There have been recent discoveries at Willow and the Nanushuk topset play have garnered much attention for Alaska.

“We hope that this continues, that the trend keeps on going,” she said. “Most of the oil from the topset has been heavier oil but the nice thing about these recent discoveries is that they are lighter oil.”

After the 2018 cutoff for the study, there were more exploration wells targeting the Brookian topset than any other target, Gregersen said.

Contact Steve Sutherland
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11
**FERTILIZER PLANT**

Werth told PN in a previous interview. In 2007, the Cook Inlet gas fields were in significant decline but have since experienced an exploration and production resurgence.

Today, the Alaska Department of Natural Resources and the U.S. Geological Survey estimate 10 trillion cubic feet of recoverable natural gas remains to be discovered in the Southcentral Alaska basin, which doesn’t include several discovered but unapped gas pools.

**Slow but sure progress**

Werth sounds more hopeful than when last interviewed by Petroleum News in 2018, but he cautioned not to expect a re-opening announcement any time soon.

To fully supply the Nutrien complex the company will need a guaranteed 160 million standard cubic feet of natural gas per day, more than Enstar, the regional gas utility, uses on average.

“I am anticipating that our daily consumption number will move lower as we find ways to achieve better energy efficiency,” Werth said June 3, “most notably within our refineries (first stage in production of ammonia from natural gas).”

“We are currently working with a couple of the industry leaders to better understand new technology (for the facility) mostly related to ‘firing’ improvements. You can imagine that plants online around the world in the last 10 years have significant advantages over the Kenai Plant in terms of cubic feet of CH4 (methane) per ton of NH3 (ammonia) produced.”

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**RENEWED INTEREST**

tors that were our counterparts from other places in the world and with the investment community. We told Alaska’s story to everyone and, likewise, two weeks ago at the Tudor Pickering & Holt conference in Houston we had a 45-minute session dedicated solely to Alaska.

In that conference, she said, DNR had callbacks from three companies who had not previously operated in Alaska but were “very keen on finding out how they can come and work here,” Feige said.

Whereas the expression “string of pearls” has been used to depict the oil fields and prospects east from Prudhoe Bay to the border of the ANWR 1002 area, the commissioner used it in an entirely different context.

“We have what I call the string of pearls,” Feige said. “We have great rocks. We have a lot of oil in the ground. We have large, continuous geologic trends with high potential for discovery success. And, we have large acreage positions that are available for acquisition.”

This list of attributes has put Alaska’s North Slope “further ahead of a lot of other basins … because it has those key elements that companies wanting to take a material position in a basin can achieve,” she said.

Some of the oil companies the state is attracting are new players, some are “old friends” showing renewed interest in Alaska, and some are existing North Slope players bringing in new investors.

One of the “key factors DNR looks at to predict trends” in industry activity, Feige said, is the number and size of transactions DNR’s Division of Oil and Gas handles each year — and those started growing last year.

In 2018 the division “processed” 173 working interest transactions … indicative of interest owners bringing interest-owner partners in with new money. … That’s a good indication Alaska is on the map and that leads to record exploration.”

This past winter drilling season on the North Slope, she said, was the busiest in 15 years.

The 2018 areawide Beaufort Sea and North Slope oil and gas sales, Feige noted, were “the most lucrative lease sales in Alaska since 1998, bringing in just over $29 million in bonus bids and we saw the highest ever per acre bid ($556).” … What I found most compelling about this lease sale was … the large acreage blocks” that were taken — “that is something that Alaska enjoys that the rest of the world and the Lower 48 do not. We have the space, the physical space, for companies to still come and put together a large acreage position to build a large exploration program. We’re definitely on the map.”

The division will be conducting an areawide lease sale this year, Feige said, targeted for December and which she hopes can be coordinated to be held on the same day as the federal ANWR 1002 and National Petroleum Reserve-Alaska lease sales.

“If the stars align” she said, they will either be on the same day or scheduled within a day or two of each other.

The SALSA — Special Alaska Lease Sale Area — lease offering is a new concept.

DNR has an “oil and gas leasing team, an evaluation team, that put this concept together last year, just before the North Slope sale;” Feige said.

In talking to oil companies after the sale, DNR learned “there wasn’t enough lead time for companies to really wrap their heads around what … the SALSA is …” These are bundled land and data packages designed to help them jumpstart exploration.

The third blocks offered last year essentially will be the same as those being offered in December — Harrison Bay (some 46,420 acres), Gwydyr Bay North Shore (some 23,040 acres) and Storms (some 30,720 acres).

Before the SALSA tracts are “strategically placed around existing and producing” North Slope units, Feige said. And each resides within a 3-D seismic survey that was acquired under the state of Alaska Tax Credit Program, available through DNR for a modest fee.

The leasing team has put together an impressive set of data that go with the SALSA blocks, such as well history, including exploration targets, well logs, mud logs, test reports, core analyses, 2-D seismic, map slides, palo analyses, geochem, maps, well cuttings, lease bidding history on tracts within each area, and references to previous partnering that companies have done in the area.

“This kind of availability of data is catching industry’s attention,” Feige said.

The commissioner pointed to maps showing permitted and large 3-D seismic surveys, some of which were shot recently, and others scheduled for next winter.

The Great Prudhoe Bay survey “sets the tone for what is possible,” Feige said. “This is Prudhoe Bay. We have been producing there for more than 45 years and now today … we’re applying new seismic technology and we’re going to produce pools of undeveloped oil. And this tells the world that our conventional resources endure for the long haul.”

The Kaukopik 3-D survey just east of the Armstrong/Repsol Horseshoe discovery and this year’s successful drilling by their new area operator Oil Search, “is showing the world what Alaska’s North Slope can do … defining what the Nanushuk play type, those Brookian discoveries, can actually become.”

Feige also referenced the “massive” offshore Barrow Arch 3-D survey, the Staiens 3-D survey abutting the ANWR 1002 area and the large 1002 area survey SALSA exploration is looking to shoot next winter.

These are the “application of new technology on a grand scale,” Feige said. “You don’t make these kinds of multi, multi-million-dollar investments if Alaska isn’t on the map.”