



THE STATE  
*of* **ALASKA**  
GOVERNOR BILL WALKER

**Department of Natural Resources**

DIVISION OF OIL & GAS

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July 31, 2018

CERTIFIED MAIL  
RETURN SERVICE REQUESTED

Mr. Erik Keskula  
North Slope Development Manager  
ConocoPhillips Alaska, Inc.  
700 G Street  
Anchorage, AK 99501

Subject: Approval of the 2018 Kuparuk River Unit Plans of Development

Dear Mr. Keskula,

The Department of Natural Resources, Division of Oil and Gas (Division) received from the unit operator ConocoPhillips Alaska, Inc. (CPAI) on June 26, 2018 its proposed 2018 Kuparuk River Unit Plan of Development (2018 KRU POD). CPAI submitted its proposed plan on its own behalf and on behalf of the other KRU working interest owners BP Exploration (Alaska), Inc., Chevron U.S.A., Inc., and ExxonMobil Alaska Production Inc. The 2018 KRU POD contains updates for the Kuparuk, Meltwater, Tabasco, Tarn, and West Sak Participating Areas (PA). The Division notified CPAI by e-mail on July 10, 2018 that the POD application was deemed complete based on the information provided under 11 AAC 83.343(a). The Division and CPAI met for the annual KRU POD presentation on July 11, 2018. CPAI presented a summary of field development activities conducted under the 2017 KRU POD and plans for proposed field development activities under the 2018 KRU POD.

The KRU was formed effective December 1, 1981, and is located immediately west of the Prudhoe Bay Unit and southwest of the Milne Point Unit. The unit includes five participating areas (PA): Kuparuk (KPA), Meltwater, Tabasco, Tarn, and West Sak. As the field has matured, reservoir management strategies and associated operational activities continue to evolve in addition to locating and drilling additional oil targets, maximizing production from the KRU relies on maintaining and upgrading facilities, increasing well work over to keep existing wells online, employing new technologies, and optimizing current and future Enhanced Oil Recovery (EOR) programs to recover the remaining oil.

### **2017 Activity**

For the period covering the 2017 POD, CPAI planned to drill 16 CTD (Coiled Tubing Drilling) sidetrack and 4 rotary wells in the KPA. CPAI also planned a workover program, non-rig well work activity, indigenous miscible injection and repair of the WI (water injection) common line for specific drill sites to allow continuous seawater injection.

The notable figures from and activities that took place at KRU overall between January 1, 2017 and December 31, 2017 are summarized as follows:

- 109.1 MBOPD total field average gross oil production from KRU (including satellite production of approximately 25 MBOPD)
- 2.69 MMSTBO cumulative oil production from KRU
- Successful implementation of 15-well Coil Tubing Drilling (CTD) program in the KPA, with 42 laterals drilled and completed in those wells, which generated a peak incremental oil rate of approximately 7.5 MBOPD
- Completion of four grassroot rotary wells in the KPA
- Drilled six West Sak wells as part of the 1H NEWS project
- Successful execution of a workover program that added approximately 2.0 MBOPD gross oil in 2017
- Continued miscible injection (MWAG) utilizing Greater Kuparuk Area (GKA) indigenous NGLs at drill sites 1B, 1C, 1D, 1E, and 2C
- The GKA produced an average rate of 9,950 BPD of indigenous NGLs to be blended with lean gas to generate an average rate of 64 MMSCFD of MI for MWAG injection. MWAG injection as part of the Enhanced Oil Recovery (EOR) is estimated to have yielded an incremental oil rate of 10.3 thousand barrels per day in 2017.
- Repair of the WI common line for drill sites 3A, 3H, 3I, and 3M to allow continuous seawater injection

Additionally, the following specific activities took place at the KRU Satellite Participating Areas (PAs) during the 2017 period and are summarized below.

### **Meltwater**

- Gross oil production from Meltwater averaged 947 BOPD in 2017
- Meltwater drill site shut-in for three weeks in June 2017 to conduct back pressure test to determine how much oil being backed-out of common KRU production line due to Meltwater producing 13 MMSCF/D of gas. Back-out estimated at 900 BPOD after test
- Water injection test conducted in injector 2P-429 to test feasibility of converting from gas injection to water Step-rate injectivity test performed after continuous two-week injection rate of 3,300 BWPD
- Two pigging operations of the DS-2P produced oil line completed in 2017
- Routine paraffin scrapes and hot diesel flushes conducted throughout 2017 on many Meltwater wells to maintain production

**Tabasco**

- Gross oil production from Tabasco averaged 1,380 BOPD in 2017
- Improved reservoir management and reduced pool average water-oil ratio to 7.6 for calendar year 2017, compared with 7.7 for calendar year 2016
- Continued sampling active producers as part of chemical tracer study initiated in 2014
- Began process of converting 2T-209 producer well into an injector well to provide additional pressure support and improve sweep efficiency

**Tarn**

- Gross oil production from Tarn averaged 7.8 MBOPD in 2017
- A rig work-over was executed and completed on producer 2L-315 to replace tubing and isolate a production casing leak, which successfully restored production

**West Sak & NEWS**

- Gross oil production from West Sak averaged 14.4 MBOPD in 2017
- Cumulative oil production of 89.6 MMstbo
- Sea water connection to drill site 1H was started-up, and achieved improved (2x) injectivity to the West Sak reservoir over using produced water. Currently four West Sak drill sites receive seawater
- 2 new producer wells (3R-101 dual-lateral, 1H-102 penta-lateral), and 4 injector wells (3R-102, 1H-118, 1H-114, 1H-111) drilled and completed
- Two new Matrix Bypass Events (MBE) developed in 2017. Seven MBE remediation treatments attempted in seven injector wells to re-establish water injection support and pattern sweep. Two of seven treatments failed (review of failures underway)
- Viscosity-reducing-water-alternating-gas (VRWAG) injection into five injector wells
- Continued field trials of through-tubing conveyed electronic submersible motor and pump systems (Rigless ESP) and ultra-fine Open Hole Stand Alone Screen (OHSAS) completions

Collectively, the Kuparuk field and the four satellite fields within the KRU had over 866 active producer and injector wells in 2017. The cumulative volume of oil produced from the KRU as of December 31, 2017 was 2.69 billion barrels compared with 2.65 billion barrels as of December 31, 2016. The average daily oil rate for the unit for the period covering January 1, 2017 through December 31, 2017 was approximately 109,100 bopd compared with 103,031 bopd, in 2016. The average daily gas rate in 2017 was 227 MMCSF, down from 236 million standard cubic feet per day (MMSCFD) in 2016. The average daily water rate in 2017 was 636,237 bwpd, up from 568,512 bwpd in 2016.

## **Proposed 2018 Activities**

Seventeen CTD sidetrack projects and five new Kuparuk rotary wells are planned for this POD period. CPAI's operations during this POD period also will focus on the following:

### **KPA**

- 5 rotary wells planned
- Import of NGLs from Prudhoe Bay expected to recommence after being stopped in 2014 (work underway to obtain regulatory approval and align piping and equipment for 2018 NGL imports into GKA from the Oliktok pipeline). Drill sites 1B, 1C, 1D, 1E, and 2C are the current target drill sites for indigenous MI injection. Re-starting NGL importation will allow expansion of MWAG injection to the relatively immature western portion of CPF-2 drill sites, primarily at drill site 2S (Sharks Tooth) and Tarn
- Re-wheel of the three central processing facility (CPF) gas lift compressors at CPF 1 during 2018-2020, which will improve compressor efficiency and allow for improved gas handling at CPF1
- Regarding corrosion monitoring and mitigation, a large project that brings In-Line Inspection (ILI) capability to 5 produced oil lines currently is being undertaken with planned completion in 2018

### **Meltwater**

- Because the gas-oil ratio at Meltwater has been rising and will soon cause the wells to be uneconomic to produce, CPAI plans to convert injection at Meltwater to water in late 2018 or early 2019
- The GI line to DS2P will be re-purposed in late 2018 to supply the drill site with water injection instead of gas. In addition to continuing to provide pressure support to the reservoir, water will help keep the production line warm during winter months as production rates from Meltwater decline
- No drilling proposed for the 2018 POD period

### **Tabasco**

- No drilling proposed for the 2018 POD period
- Complete conversion of 2T-209 producer well into water injector well to provide more pressure support and improve sweep efficiency from periphery area, in addition to 2T-201 and 2T-217A

### **Tarn**

- No drilling proposed for the 2018 POD period

## West Sak

- Drill and complete 2 new rotary wells at DS-1H (1 horizontal penta-lateral producer and 1 vertical injector)
- Drill and complete 5 new rotary wells at DS-3R (3 horizontal dual-lateral producers, and 2 horizontal injectors)

The overlaying Cretaceous Brookian Moraine interval (Torok) at DS-3S is currently is being produced under an approved Tract Operation to evaluate productivity and waterflood performance of the reservoir ahead of potential further development with a two-well pilot project (producer injector pair, 3S-613 and 3S-620). 3S-620 currently produces approximately 350-450 BOPD. A follow-up well pair is planned to be drilled in 2019 to further de-risk waterflood performance.

Although the 1H-Ugnu-401 well has been shut-in since 2014 due to problems with the electric submersible pump (ESP), CPAI continues to work through ESP troubleshooting in an effort to return 1H-401 to production with an upgraded pump to determine if higher oil production rates can be sustained.

Finally, although larger infrastructure projects such as the Kuparuk airstrip, portions of the Kuparuk camp and office space have been completed, operations support infrastructure will continue to be assessed for either upgrade or replacement to target another 25 years of production from the KPA and KRU satellite fields.

## POD Evaluation Criteria

The Division must consider the criteria in 11 AAC 83.303(a) and (b) when evaluating a POD for approval. 11 AAC 83.303(c)(3). The Division will approve a POD upon a finding that it is necessary or advisable to protect the public interest and that it will (1) promote conservation of all natural resources, including all or part of an oil or gas pool, field, or like area; (2) promote the prevention of economic and physical waste; and (3) provide for the protection of all parties of interest including the state. 11 AAC 83.303(a). In evaluating conservation, prevention of waste, and the parties' interest, the Division will consider (1) the environmental costs and benefits of unitized exploration or development; (2) the geological and engineering characteristics of the potential hydrocarbon accumulation or reservoir proposed for unitization; (3) prior exploration activities in the proposed unit area; (4) the applicant's plans for exploration or development of the unit area; (5) the economic costs and benefits to the state; and (6) any other relevant factors, including measures to mitigate impacts identified above, the commissioner deems necessary or advisable to protect the public interest. 11 AAC 83.303(b).

## Findings and Decision

In approving earlier KRU PODs, the Division considered 11 AAC 83.303 and found the KRU PODs promoted conservation of natural resources, promoted prevention of waste, and protected the parties' interests. The Division incorporates those finding by reference.

The 2018 POD will benefit the state through reservoir management and continued oil production from the KRU. Production protects the State's economic interests in developing oil and gas resources. Continuing to develop the resources as a unit further minimizes impact to the environment, conserves resources, and prevents waste. Considering the 11 AAC 83.303(b) factors and subsection (a) criteria and the degree to which the additional development impacts its analysis from previous POD approvals, the Division finds that the 2018 KRU POD protects the public interest, promotes conservation, prevents waste, and protects the parties' interests.

Based on its findings, the Division approves the 2018 KRU POD for the period August 1, 2018 through July 31, 2019.

CPAI previously was notified in the July 27, 2017 approval of the 2017 KRU POD that its 2018 POD was to be submitted 90 days before the 2017 POD expired, on or before May 2, 2018. CPAI, however, late-filed its proposed 2018 POD on June 26, 2018. Pursuant to Article 17.1, the KRU agreement "shall be" subject to all valid applicable laws, rules, regulations and orders in effect on the effective date of the agreement, and to all laws, rules, regulations, and orders subsequently enacted or adopted after the effective date of the agreement. The 2019 POD therefore is due to the Division 90 days before the 2018 POD expires, on or before May 2, 2019, in accordance with 11 AAC 83.343(c).

A person affected by this decision may appeal it, in accordance with 11 AAC 02. Any appeal must be received within 20 calendar days after the date of "issuance" of this decision, as defined in 11 AAC 02.040(c) and (d) and may be mailed or delivered to Andrew T. Mack, Commissioner, Department of Natural Resources, 550 W. 7th Avenue, Suite 1400, Anchorage, Alaska 99501; faxed to 1-907-269-8918, or sent by electronic mail to [dnr.appeals@alaska.gov](mailto:dnr.appeals@alaska.gov). This decision takes effect immediately. An eligible person must first appeal this decision in accordance with 11 AAC 02 before appealing this decision to Superior Court. A copy of 11 AAC 02 may be obtained from any regional information office of the Department of Natural Resources.

If you have questions regarding this decision, contact Ken Diemer with the Division at 907-269-8784 or via email at [Ken.Diemer@Alaska.gov](mailto:Ken.Diemer@Alaska.gov).

Sincerely,



Chantal Walsh  
Director