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October 1, 2015

Ms. Corri Feige  
Alaska Department of Natural Resources  
Division of Oil and Gas  
550 West 7<sup>th</sup> Avenue, Suite 800  
Anchorage, AK 99501-3560

Re: North Cook Inlet Unit 2016 Plan of Development

Dear Ms. Feige:

ConocoPhillips Company ("ConocoPhillips"), in its capacity as Operator of the North Cook Inlet Unit, submits for your review and approval a copy of the 2016 North Cook Inlet Unit Plan of Development. Upon approval by the Alaska Department of Natural Resources (DNR), this plan will be effective January 1, 2016 through December 31, 2016.

If future evaluation warrants changes in North Cook Inlet Unit activity, an updated Plan of Development will be submitted in a timely manner before any operations are initiated.

ConocoPhillips requests that the North Cook Inlet Unit structure map (Figure 1, Page 7) be held confidential and protected under AS 38.035 (a) (8) (c), 11 ACC 82.810 (DNR Confidentiality) and AS 45.50.910 et seq. (Trade Secrets).

If you have any questions, please call me at (907) 265-6412.

Sincerely,

A handwritten signature in blue ink, appearing to read "A. Nikouline".

Alexis Nikouline  
Cook Inlet Reservoir Engineer

Enclosures

cc e-mail  
Kevin Snow  
Julie Little  
Kathleen King, DNR

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DIVISION OF  
OIL AND GAS

## **NORTH COOK INLET UNIT 2016 Plan of Development**

### **PERIOD**

This Plan shall cover the period from January 1, 2016 through December 31, 2016.

### **PLAN OF DEVELOPMENT**

This plan of development is written as outlined in 11 AAC 83.343 (a) and is based on data available prior to the submittal deadline.

### **OVERVIEW**

The North Cook Inlet Unit is a developed and delineated producing gas field. North Cook Inlet Unit has been producing since 1969 using a cluster-style development from the offshore Tyonek Platform. In 2008 three wells were drilled into the Tertiary Gas Pool. An influx of water from higher pressure aquifers was found in some wells causing the field average reservoir pressure to increase from 2008 to 2011. The 2015 surveys showed an average pressure of 486 psia at reference datum (4100' SSTVD), which is very close to the 2012 surveys average. Well shut-in bottom-hole pressures ranged from 228 psia to 1,353 psia. Production has been on decline since the 2009 drilling program due to declining reservoir pressure in most zones and sand production in isolated zones.

### **GEOLOGY**

The North Cook Inlet structure is a broad fault propagation fold with a steeply dipping reverse fault on the east side and a faulted structural ridge to the north (Figure 1). The structure is not filled to spill-point, so the developed reservoir has four-way dip closure. Gas is produced from stacked fluvial sandstones in two Tertiary-aged formations: the overlying high net-to-gross Cook Inlet Sand interval of the Sterling Formation, and the underlying low net-to-gross Beluga Formation. The gross thickness of these fluvial sediments is around 3,300 feet with total perforated interval thickness ranging from 225-400 feet. At the Cook Inlet Sand interval wells are more closely spaced, and the thicker blockier sands demonstrate pressure continuity. At the Beluga interval, well spacing increases with depth, and some of the thinner channel sands in the Beluga interval appear to be laterally connected, but not vertically connected, based on results of recent infill drilling. Other sands deeper in the Beluga formation appear to be laterally and vertically discontinuous, with decreasing porosity and permeability as depth increases. Multiple fluid contacts are indicated, but there are several wells that encountered water along the flanks of the structure, which bracket the areal extent of the gas accumulation.

## **FORWARD PLANS**

- (1) **long-range proposed development activities for the unit, including plans to delineate all underlying oil or gas reservoirs, bring the reservoirs into production, and maintain and enhance production once established;**

The team continues to evaluate future rig work-over and/or drilling opportunities. A rig-workover program is currently being planned for 2017.

- (2) **plans for the exploration or delineation of any land in the unit not included in a participating area;**

ConocoPhillips plans to continue to evaluate potential undeveloped accumulations.

- (3) **details of the proposed operations for at least one year following submission of the plan;**

Proposed operations for the plan period of 2016 will focus on continued safe operations and efficient management of produced fluids. During the next year, ConocoPhillips plans to

- Maintain asset and operating integrity,
- Perform annual regulatory inspections,
- Evaluate and perform work as needed to maintain well integrity and optimize resource recovery.

- (4) **the surface location of proposed facilities, drill pads, roads, docks, causeways, material sites, base camps, waste disposal sites, water supplies, airstrips, and any other operation or facility necessary for unit operations.**

The Tyonek platform is located in the Cook Inlet at 61°04'35"N Latitude by 150°57'02"W Longitude. The attached map (Figure 1) shows the Tyonek platform, development wells, nearby exploration wells, and unit boundary. Also shown is the depth structure of the top of the Cook Inlet 1 sand.

## **PREVIOUS PLAN REVIEW (January 1, 2015 to December 31, 2015)**

This review of the previous Plan is written as outlined in 11 AAC 83.343 (c) and describes the extent to which the requirements of the previously approved Plan were achieved.

1. **Install temporary living quarters to accommodate ongoing facilities operations**  
Temporary living quarters are currently on the Tyonek Platform drilling deck and are occupied as of September 2015.

2. Finish analysis and begin facility siting project  
Detailed Engineering was completed in 2015. One construction package was implemented during the 2015 platform turnaround. The remaining packages are being planned for future construction.
3. Continue to design and potentially start renovations of the living quarters  
A temporary living quarters was erected and placed in service in 2015 as design of the permanent living quarters continues.
4. Evaluate possible helideck/aviation upgrades  
Evaluation of possible helideck upgrades began in 2015 and is on-going.
5. Evaluate and potentially install / improve artificial lift to de-water up to five or more wells (if not completed in 2014).  
A new deep gas lift system was installed in B-01A in March 2015. Deep gas lift was also re-ran in A-06 (March 2015) and A-14 (January 2015).
6. Perform annual regulatory inspections  
Annual regulatory inspections have been completed.
7. Upgrade the turbine compressors to decrease well flowing tubing pressure  
Both second stage compressors were re-staged in March 2015.
8. Upgrade lube oil coolers to accommodate upgrade to the turbine compressor (if not completed in 2014).  
The upgrade of the lube oil coolers was completed in February 2015. The re-wheeling of the 2<sup>nd</sup> – stage turbine compressors was completed in the 2014-2015 winter to allow lower header pressure and optimize production.
9. Evaluate and perform wellwork as needed to maintain well integrity and optimize resource recovery.  
Wellwork was evaluated and performed to maintain well integrity and optimize resource recovery, including:
  - A-14 GLV change out (April 2015),
  - B-01A GLV change out (April 2015),
  - A-09 nitrogen lift (March 2015), and
  - A-13 caliper and warm back logs for EPA (August 2015).
10. Sandblast and recoat up to two more girder tanks for produced and run-off water  
Not performed. Evaluation of girder tanks indicated that the tanks had no integrity issues.
11. Plan and execute a platform turnaround in late summer/early fall 2015  
Platform turnaround was completed in August 2015.

## **OTHER OPERATIONS CONDUCTED DURING THE PRECEEDING YEAR (2015)**

No other significant operations have been conducted in 2015.

### **STATUS OF SHUT-IN WELLS:**

#### A-01 (API 508832001600)

A-01 last produced in October 2006. Attempts to revive the well in October 2006 were unsuccessful. A video log was run in 2012 without conclusive results. This well is on the schedule for remediation when concentric coiled tubing returns to the platform.

#### A-03 (API 508832002000)

A-03 last produced continuously in August 2012. The well had sand and water influx. The well was flown intermittently in March and April 2013, and more intermittent flow periods are planned for this year.

#### A-07 (API 508832002700)

A-07 last produced gas in May 2012. Deep gas lift was installed in March, 2013 but the well only produced water. The Deep Gas Lift system was pulled in 2015. Reinstallation is deferred until next coil campaign.

#### A-08 (API 508832002800)

A-08 last produced in November 2009. Deep gas lift was installed in March, 2013 but the well only produced water. We have no immediate remedial action planned as this well has no simple solution for potential water shut-off. The well is under evaluation as a potential sidetrack candidate.

#### A-10a (API 508832003001)

A-10a last produced in June 2010. Remediation attempts in 2010 and April 2012 were not successful. This well had sand and water influx. This well is on the schedule for remediation when concentric coiled tubing returns.

#### A-12 (API 508832003200)

A-12 last produced in September 2014. The well produced some sand and was shut-in for evaluation. While shut-in, the well appears to have liquid loaded. Attempts have been made to get the well back on production, but so far have not been successful.

#### A-16 (API 508832012700)

A-16 last produced in March 2010. The well had multiple influxes of sand. The well was cleaned out, but filled up with sand again in a static condition. Attempts were made in 2012 to clean the well back out with slickline, but progress was not significant. This well is on the schedule for remediation when concentric coiled tubing returns. Pending successful test of the SVS, this well is under evaluation to bring back online.

#### B-02 (API 5088320090001)

Drilled as a Tyonek Deep oil prospect well, B-02 is under evaluation as a gas producer within the existing unit area. The well has been cemented above the current perforations.

**Table 1**  
**Production History for the Most Recent Complete Year**  
**2014**  
**MMSCF**

<b>Well Name</b>	<b>Well API #</b>	<b>1/1/14 - 12/31/14 Yearly Total</b>	<b>Cum Prod. Through 12/31/13</b>
A-01	50883200160000	0	139884
A-02	50883200180000	2210	171103
A-03	50883200200000	0	157300
A-04	50883200230000	571	180612
A-05	50883200250000	2299	189922
A-06	50883200260000	343	164827
A-07	50883200270000	0	166471
A-08	50883200280000	0	93667
A-09	50883200290000	1553	129607
A-10A	50883200300100	0	98156
A-11	50883200310000	0	69174
A-12	50883200320000	962	182393
A-13	50883200870000	0	88204
A-14	50883201350000	819	5917
A-15	50883201360000	860	5856
A-16	50883201370000	0	957
B-01A	50883200930100	211	17641
B-03	50883200950000	406	19146
<b>Sum</b>		<b>10233</b>	<b>1880837</b>

**Figure 1**  
**North Cook Inlet Unit - Top Cook Inlet 1 Depth Structure**

Marked CONFIDENTIAL by operator. Complete copy in RE 8th floor vault.



Confidential and protected under AS 38.05.035 (a) (8) (c), 11 AAC 82.810 (DNR Confidentiality) and AS 45.50.910 et seq (Trade Secrets).