SOUTHERN MILUVEACH UNIT

DENIAL OF UNIT AREA EXPANSION

Findings and Decision of the Director
of the Division of Oil and Gas
Under a Delegation of Authority
from the Commissioner of the State of Alaska
Department of Natural Resources

January 24, 2018

CONTENTS

I. INTRODUCTION AND DECISION SUMMARY 1
II. UNIT BACKGROUND 1
III. APPLICATION AND LEASE SUMMARY 2
IV. DISCUSSION OF DECISION CRITERIA 5
A. Decision Criteria considered under 11 AAC 83.303(b) 5
1. Environmental Costs and Benefits 5
2. Geological and Engineering Characteristics and Exploration History 6
3. Plans of Development 16
4. The Economic Costs and Benefits to the State and Other Relevant Factors 16
B. Decision Criteria considered under 11 AAC 83.303(a) 17
1. Promote the Conservation of All Natural Resources 17
2. The Prevention of Economic and Physical Waste 17
3. The Protection of All Parties of Interest, Including the State 18
V. FINDINGS AND DECISION 19
A. The Proposed Expansion Does Not Meet the Requirements for a Unit Expansion 19
B. The Application Does Not Demonstrate Conservation of Natural Resources 20
C. The Application Does Not Demonstrate Prevention of Economic and Physical Waste 20
D. The Proposed Expansion Protects BRPC and the Working Interest Owners, but not the Public or the State 20

I. INTRODUCTION AND DECISION SUMMARY

The Department of Natural Resources, Division of Oil and Gas (Division) received an application to expand the Southern Miluveach Unit (SMU) on June 21, 2017 (Application) from the SMU Operator, Brooks Range Petroleum Corporation (BRPC). In support of the Application, BRPC submitted confidential geological, geophysical, and engineering data and analysis along with a proposed Plan of Development (POD). BRPC then amended the application on October 10, 2017, to add another lease. References to the "Application" below include this amendment.

The SMU Unit Agreement, Article 13.1, states that the operator may apply to expand the unit "to include any additional lands determined to overlie a Reservoir that is at least partially within the Unit Area, or to include any additional lands that facilitate production." Thus, BRPC must show that either there is a reservoir in the existing SMU that extends into the expansion area or BRPC has plans to use the expansion area to facilitate production from SMU. A unit's area in general must be "the minimum area required to include all or part of one or more oil or gas reservoirs, or all or part of one or more potential hydrocarbon accumulations." 11 AAC 83.356(a). Thus, BRPC must show that, as expanded, the unit would be no bigger than necessary to include all or part of a potential hydrocarbon accumulation or reservoir. In addition, the Division must consider whether the expansion is in the State and public interest, taking into account whether the expansion would promote conservation, prevent economic and physical waste, and protect all parties of interest, including the State. AS 38.05.180(p); 11 AAC 83.303.

The Application does not support the proposed expansion. BRPC describes a generalized concept for developing the expansion area, but offers no firm commitments to do so. Thus, BRPC has not demonstrated that the proposed expansion area facilitates production. The data BRPC provided also falls short of demonstrating that the expansion area includes part of a reservoir extending from the existing unit. Nor does the data demonstrate that the expanded unit would be the minimum area necessary to include all or part of a reservoir or potential hydrocarbon accumulation. BRPC further fails to demonstrate, through data or exploration and development plans, that the proposed expansion would promote conservation, prevent economic and physical waste, or protect all parties of interest. Accordingly, the proposed expansion is denied.

II. UNIT BACKGROUND

SMU, formed March 31, 2011, is located on the North Slope of Alaska, south of the Kuparuk River Unit. SMU contains 8,960 acres encompassing five state oil and gas leases. The initial Plan of Exploration (POE), approved with the unit formation, required BRPC to drill, evaluate, and test three wells—North Tarn 1A, Mustang 1, and Mustang 2—in the Kuparuk formation by May 31, 2012. BRPC timely drilled the North Tarn 1A and Mustang 1 (M-01) wells. At BRPC's

request, the Division extended the Mustang 2 (M-02) drilling requirement to May 31, 2014. BRPC failed to meet this deadline and the Commissioner issued a notice of default, giving BRPC until May 31, 2015 to drill, evaluate, and test the well to cure default. BRPC appealed the notice of default. While that appeal was pending, BRPC drilled the M-02 well, but found only a short section of the Kuparuk reservoir and asked to use the well for observation instead of testing it. The Division accepted the alternative use of the well and found that BRPC had cured default.

Based on its exploration operations during the unit's five-year primary term, the Division granted a discretionary unit extension from April 1, 2016 through December 31, 2017. In late 2017 BRPC reentered and tested the North Tarn 1A well and received certification that it is capable of producing in paying quantities on December 20, 2017. The certification of this well extends the unit so long as BRPC is continuously producing or conducting operations under an approved plan of development, as set forth in 11 AAC 83.336(a)(1). BRPC is not currently producing, so the continuation of SMU hinges on BRPC conducting operations to achieve sustained production.

III. APPLICATION AND LEASE SUMMARY

BRPC submitted the Application on June 21, 2017. The Application included proposed revisions to Unit Agreement Exhibits A (list of leases) and B (unit map), a proposed POE, and geological, geophysical, and engineering data for which BRPC requested confidentiality under AS 38.05.035(a)(8).

When applying for a unit or unit expansion, an operator must demonstrate reasonable effort to obtain joinder of all proper parties to a unit agreement. At the time BRPC submitted the Application, the working interest owners in the proposed expansion area were Caracol Petroleum LLC, TP North Slope Development LLC, MEP Alaska LLC, Ramshorn Investments Inc., and AVCG LLC, all of whom were already signatories to the SMU Unit Agreement and Unit Operating Agreement. Thus, there were no new parties to join the unit. On July 13, 2017, however, the Division approved assignment of Ramshorn's interest in the SMU and proposed expansion area leases to Nabors Drilling Technologies USA, Inc. Nabors ratified the SMU Unit Agreement and Unit Operating Agreement on September 19, 2017. With that ratification, all proper parties to the proposed expansion have already joined the unit. MEP Alaska LLC applied to assign its interest in SMU and the proposed expansion area to BRPC on December 29, 2017. That application is still pending, but if granted, BRPC is already a signatory to the unit agreement as the Unit Operator.

The Division informed BRPC by email on June 22, 2017 that the Application was incomplete because the proposed POE did not provide the information required by 11 AAC 83.341. The Division also observed that since SMU is under a POD, it would be more appropriate to submit a supplement to the existing POD rather than a separate POE. BRPC submitted a POD supplement, in replacement of the proposed POE, on June 23, 2017. The Division notified BRPC by email on June 27 that the proposed POD met the minimum regulatory requirements for a POD and thus the unit expansion application was complete, but encouraged BRPC to consider submitting a proposed

POD with greater detail to better support its application. BRPC provided a revised POD in support of the Application on June 29, 2017.

The Division published a public notice in the *Alaska Dispatch News* and *Arctic Sounder* on July 13, 2017, in compliance with 11 AAC 83.311. Copies of the Application and the public notice were provided to interested parties. DNR provided public notice to the North Slope Borough, the Native Village of Barrow, City of Utqiaġvik (Barrow), Inupiat Community of the Arctic Slope, Arctic Slope Native Association, Ukpeaġvik Inupiat Corporation, City of Nuiqsut, Native Village of Nuiqsut, Kuukpik Corporation, the Arctic Slope Regional Corporation, libraries in Barrow and Nuiqsut, and the Fairbanks, Barrow, and Nuiqsut Postmasters, as well as the Alaska Department of Environmental Conservation, the Alaska Department of Fish and Game, and the Alaska Oil and Gas Conservation Commission. The public notices invited interested parties and members of the public to submit comments by August 14, 2017.

The Division received comments from the Alaska Industrial Development and Export Authority (AIDEA). AIDEA stated that it supported the expansion, that it would provide economic benefit to the State if BRPC eventually produced from the expansion area, that the expansion "provides significant additional financial security" to the existing SMU project, that it is AIDEA's understanding that BRPC intends to engage Alaska-based vendors, and that AIDEA generally supports additional infrastructure west of the Kuparuk River Unit.

In a letter dated October 10, 2017, BRPC requested ADL 392627 be added to the Application. The Division accepted the addition but determined that a new public notice would be necessary. The revised public notice was published October 26, 2017 and invited interested parties and members of the public to submit comments by November 27, 2017. The Division did not receive any comments.

The proposed expansion would more than triple the size of the unit, from 8960 acres to 30,432 acres with the following leases:

Tract	ADL	Lease Term	Acres	Royalty	Working Interest Owners
6	391546	7/1/2010 – 6/30/2017	2560	16.66667%	Caracol 47.25% TPNS 29.25% MEP 13.5% Nabors 5.96% AVCG 4.04%
7	391547	7/1/2010 – 6/30/2017	1280	16.66667%	Caracol 47.25% TPNS 29.25% MEP 13.5% Nabors 5.96% AVCG 4.04%
8	393565	7/1/2017 – 6/30/2024	1239	16.66667%	Caracol 52.5% TPNS 47.5%
9	393564	7/1/2017 – 6/30/2024	640	16.66667%	Caracol 52.5% TPNS 47.5%

Tract	ADL	Lease Term	Acres	Royalty	Working Interest Owners
10	391550	7/1/2010 – 6/30/2017	1241	16.66667%	Caracol 47.25% TPNS 29.25% MEP 13.5% Nabors 5.96% AVCG 4.04%
11	391549	7/1/2010 – 6/30/2017	1920	16.66667%	Caracol 47.25% TPNS 29.25% MEP 13.5% Nabors 5.96% AVCG 4.04%
12	391548	7/1/2010 – 6/30/2017	1920	16.66667%	Caracol 47.25% TPNS 29.25% MEP 13.5% Nabors 5.96% AVCG 4.04%
13	392628	3/1/2014 – 2/29/2024	1840	16.66667%	Caracol 47.25% TPNS 29.25% MEP 13.5% Nabors 5.96% AVCG 4.04%
14	391551	7/1/2010 – 6/30/2017	1920	16.66667%	Caracol 47.25% TPNS 29.25% MEP 13.5% Nabors 5.96% AVCG 4.04%
15	391552	7/1/2010 – 6/30/2017	2491	16.66667%	Caracol 47.25% TPNS 29.25% MEP 13.5% Nabors 5.96% AVCG 4.04%
16	391540	7/1/2010 – 6/30/2017	2501	16.66667%	Caracol 47.25% TPNS 29.25% MEP 13.5% Nabors 5.96% AVCG 4.04%
17	392627	3/1/2014 – 2/29/2024	1920	16.66667%	Caracol 47.25% TPNS 29.25% MEP 13.5% Nabors 5.96% AVCG 4.04%
		Total Acreage	**21,472**		

IV. DISCUSSION OF DECISION CRITERIA

Leases may be joined into a unit to conserve the natural resources of all or a part of an oil or gas pool, field, or like area when determined and certified to be necessary or advisable in the public interest. AS 38.05.180(p). Conservation means "maximizing the efficient recovery of oil and gas and minimizing the adverse impacts on the surface and other resources." 11 AAC 83.395(1). But a unit must consist of "the minimum area required to include all or part of one or more oil or gas reservoirs, or all or part of one or more potential hydrocarbon accumulations." 11 AAC 83.356(a). Thus, to expand a unit, the proposed expansion area must itself contain all or part of a reservoir or potential hydrocarbon accumulation, and joining the expansion area with the existing unit must serve to both maximize recovery of those resources and minimize the adverse impacts from development. The SMU Unit Agreement, Article 13.1, further states that the unit may be expanded "to include any additional lands determined to overlie a Reservoir that is at least partially within the Unit Area, or to include any additional lands that facilitate production."

The Commissioner further considers whether expanding a unit 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), (c). In evaluating these criteria, the Commissioner considers (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 necessary or advisable to protect the public interest. 11 AAC 83.303(b), (c).

By Department Order 003, the Commissioner delegated authority to the Division Director to decide unit expansions. The Director delegated decision-making authority for this particular Application to the Deputy Director.

A discussion of the 11 AAC 83.303(b) criteria, as they apply to the Application, is set out below, followed by a discussion of the 11 AAC 83.303(a) criteria.

A. Decision Criteria considered under 11 AAC 83.303(b)

1. Environmental Costs and Benefits

A unit expansion is an administrative action that approves no on-the-ground activity, so the expansion itself poses no environmental costs or benefits. But the resulting development as an expanded unit may or may not impact the environment. Developing the expansion area in general poses potential environmental costs, but the leases and DNR oversight provide protections to mitigate those costs. The expansion area is habitat for various mammals, birds, and fish and area residents may use this area for subsistence hunting and fishing. Oil and gas activity may affect some wildlife, habitat, and subsistence activity. The expansion area leases each include mitigation measures designed to minimize or avoid adverse impacts to the land and

wildlife, and BRPC will need to comply with those mitigation measures when proposing operations or propose alternatives that are sufficiently protective to justify an exception.

BRPC's specific plans for the expansion area indicate little, if any, environmental benefit. BRPC states that it intends to install a 15-acre gravel pad in the expansion area to accommodate up to 40 wells, then transport produced fluids to the Mustang pad in the existing unit for processing. According to BRPC, processing production at the Mustang pad would avoid the environmental impact of installing a separate processing facility in the expansion area. It is worth noting that these plans are all highly speculative—there is currently no facility at the Mustang pad to process production from SMU or the proposed expansion. But even as a speculative concept, it is not clear that BRPC's plans offer significant environmental benefits. The pad BRPC plans to install in the expansion area is comparable in size to the Mustang pad where it plans to install a processing facility. In other words, the absence of a processing facility does not decrease BRPC's anticipated footprint in the expansion area. Thus, it is unclear from BRPC's application that developing the expansion area as part of SMU would benefit the environment when compared to separate development of the expansion area. Joint development of leases in general often provides environmental benefits by decreasing surface impacts, and it is possible BRPC could develop a project that provided environmental benefits. But the Application and the current plans BRPC has provided do not provide sufficient detail to conclude that there would be any particular environmental benefit to expanding the unit.

2. Geological and Engineering Characteristics and Exploration History

Introduction

Geologic, geophysical, and engineering data submitted in support of the Application included: well logs and analyses from wells within the existing unit and surrounding area, geologic cross sections, confidential well results, proprietary petrophysical analysis, and proprietary seismic data, including mapped horizons and interpretations.

The existing SMU encompasses approximately 8,960 acres adjacent to the Kuparuk River Unit (KRU) boundary west of KRU drill sites 2M, 2S, and north of 2L. The proposed expansion would add approximately 21,472 acres to the north and west of the current SMU and would border the Placer Unit (PU) to the northwest.

After successfully drilling three exploration wells (North Tarn 1 & 1A, and Mustang 1) in the SMU, BPRC is currently pursuing development of the Kuparuk Formation at SMU. Development drilling was initiated in 2015 with three wells drilled from the installed Mustang Pad; SMU M-02 well, which was completed as an injection well, SMU M-01A (Mustang 1A), which was suspended at intermediate casing point, and SMU M-03, which was suspended at the surface casing point. Both suspended wells encountered drilling difficulties associated with elevated pressures in the Kuparuk reservoir from ongoing development activities at KRU. Elevated Kuparuk pressures were first encountered by BRPC when drilling the North Tarn 1 well in 2011. In late 2017, BRPC reentered the North Tarn 1A well and fracture stimulated and flow

tested the well. Based on the results, the Division certified the well as capable of producing in paying quantities. To date, sustained oil production has not commenced.

BRPC has applied for the expansion based on the interpreted prospectivity of the Cretaceous Brookian strata, particularly slope and basin-floor fan deposits in the Torok Formation, and the prospect of additional accumulation of reservoir quality Cretaceous Kuparuk C sand in the expansion area. The Division reviewed the Application and supporting data to determine whether BRPC had demonstrated a reservoir that extends from the existing unit into the proposed expansion and whether BRPC has demonstrated one or more sufficiently delineated potential hydrocarbon accumulations in the proposed expansion area.

Exploration History

BRPC has not drilled any exploration wells in the proposed expansion area itself. Instead, its Application relies on pre-existing wells and data from surrounding areas. BRPC has acquired and interpreted seismic data over the expansion area. The following is a summary of the exploration history in the vicinity of the proposed expansion area.

Exploration in the areas of SMU and the Colville Delta began with a focus on large structures with Ellesmerian sequence targets in the late-1960s to the mid-1970s. There was a shift toward exploring combination structural/stratigraphic prospects in the Beaufortian sequence in the mid-1970s through the mid-1990s. From the mid-1990s to the present, there has been increased emphasis on drilling stratigraphic and combination traps with multiple reservoir targets in the Beaufortian and Brookian sequences. Beyond the information presented in this decision, details of many individual well summaries, cores, and test results are described in previous unit decisions in the vicinity surrounding the SMU, including the Colville River, Qugruk, Oooguruk, Pikka, Tofkat, and Placer unit decisions, as well as the Tabasco, Tarn, Meltwater, Qannik, Fiord-Kuparuk, Fiord-Nechelik, Nanuq-Kuparuk, and Nanuq-Nanuq PA decisions.

The first exploration wells drilled near the proposed SMU expansion were the Colville 1 and Kookpuk 1 wells. Sinclair Oil and Gas (Sinclair) drilled the Colville 1 well in 1965/66. This well was drilled to a measured depth (MD) of 9,930 feet (ft) in the SW¼ Sec. 25, T12N, R7E, U.M., approximately one mile north of the proposed expansion area. The primary target in this early well was the Paleozoic-age Lisburne Formation which was encountered, evaluated, and deemed unsuccessful after reaching the total depth (TD) in Pre-Mississippian-age metamorphic argillite. This well was the first well to encounter oil shows in shallower intervals in the Brookian Torok Formation. Oil shows were reported on the mud log between approximately 5,274 to 5,420 ft MD (−5,224 to −5,370 ft total vertical depth subsea (TVDSS)). The interval was described in the mud log as dark grey to brown, very fine-grained, quartzose sandstone. Samples exhibited a gold fluorescence and a gold cut fluorescence. Porosity was estimated as poor. Sixteen feet of core was cut and 14 feet recovered between 5,318 and 5,334 ft MD. No data from the core are available.

The Kookpuk 1 well was drilled in 1966–67 by Union Oil Company of California (Unocal) to a TD of 10,193 ft MD in the SW¼ Sec. 19, T11N, R7E, U.M., just inside the western boundary of

the proposed expansion area. The well reached TD in Pre-Mississippian-age argillite after drilling the complete Ellesmerian stratigraphic section. No production tests were attempted in this well. Two conventional cores were recovered from the well. Core 1 recovered 2 ft of siltstone from the top of the Triassic-age Shublik Formation between 8,028 ft and 8,030 ft MD. Core 2 recovered 16 ft of argillite from 10,177 ft to 10,193 ft MD. Occasional trace oil shows were present in the shallower, Cretaceous-age Torok Formation between approximately 4,750 ft to 5,500 ft MD in the wellbore. Based upon analysis of cuttings samples, this interval was described as consisting predominantly of inter-bedded siltstone and shale with very-rare occurrence of very fine-grained sand. The sample description appears to be consistent with the well log response through this interval, as the deep resistivity curve is steady at approximately 4–5 ohms and the gamma ray curve consistently ranges from approximately 90–105 API units.

Since these two exploration wells in the 1960s, producible hydrocarbons have been encountered in other stratigraphic intervals and is developed in producing units and fields now surrounding SMU and the expansion area. KRU is adjacent to SMU and the proposed expansion area and produces from both the Lower Cretaceous-age Kuparuk River Formation in the Kuparuk Participating Area (KPA) and the shallower Upper-Cretaceous Bermuda sands of the Seabee Formation in the Tarn Participating Area (TPA). More recently, the KRU operator has embarked on a pilot program to produce and evaluate the commerciality of the Torok Formation within the area of KRU approximately three miles north of the proposed SMU expansion acreage. Similar pilot production and evaluation of further development of the Torok Formation is ongoing in the Oooguruk Unit (OU) further north. Approximately ten miles to the west, the Colville River Unit (CRU) produces from the Jurassic-age Alpine and Nechelik sands in the Kingak Formation, from isolated accumulations of the Lower Cretaceous-age Kuparuk C sand and from Upper Cretaceous-age Nanuq sands in the Torok Formation with shallower Qannik sands in the Nanushuk Formation.

In addition to those wells associated with the above-mentioned producing units and fields, numerous other exploration wells have been drilled near the proposed SMU expansion. These wells have had varying success in encountering hydrocarbon-bearing strata and many projects, such as Pikka and Placer, are in various stages of delineation and evaluation, which ultimately may lead to additional development, but as of yet, have not progressed to production.

The Colville River 1 well was drilled in 1993 by ARCO Alaska Inc (ARCO) in the NW¼ Sec. 17, T11N, R6E, U.M., four miles west of the proposed SMU expansion area. The well drilled to a total depth of 7,300 ft MD (−7,254 ft TVDSS). The original objective for the well was the Cretaceous-age sands within the Kuparuk Formation and was deemed unsuccessful. Weak oil shows were present up-hole, between approximately 5,700 ft and 6,050 ft MD (−5,654 ft to −6,003 ft TVDSS) in thinly inter-bedded sandstone, siltstone, and shale in the basal portion of the Torok Formation. From rotary and percussion sidewall cores recovered in this interval, the sands were generally described as well cemented, very fine- to fine-grained, with occasional to medium-size grains. Measured porosity ranged 9–18% and permeability ranged <1–7 millidarcies (md). No production tests were attempted. The well was then deepened to penetrate Jurassic-age strata in the Kingak Formation where it encountered inter-bedded siltstone and very fine- to fine-grained sandstone. Cuttings from this interval displayed weak to fair oil

shows in the form of sample and cut fluorescence. No cores or production tests were attempted in this portion of the well.

In 2003, ConocoPhillips Alaska Inc. (ConocoPhillips) drilled the Oberon 1 well in the SE¼ Sec. 9, T10N, R6E, U.M., approximately three miles west of the expansion area. Again, the primary target of this well was an accumulation of Kuparuk C sand preserved above the Lower Cretaceous Unconformity (LCU). A secondary target was the Jurassic-age Alpine sands in the Kingak Formation. The well was drilled to a total measured depth of 7,580 ft (−7,428 ft TVDSS) and bottomed in the Kingak formation below the Alpine sand interval. The Kuparuk C interval was encountered at 6,810 ft MD (−6,690 ft TVDSS) in the well with no appreciable sand resolvable on the well logs. The mud logs described a thin, firm to hard sandy siltstone grading to lower fine-grained sandstone with common glauconite and siderite. Porosity was estimated to be poor due to the presence of clay matrix and siderite cement. This probably represents a thin transgressive lag atop the LCU. Samples exhibited approximately 10% pale yellow fluorescence and a weak, milky pale yellowish cut fluorescence. The Alpine interval was penetrated between approximately 7,252 ft to 7,471 ft MD (−7,112 ft to −7,323 ft TVDSS). Based upon well logs, the interval appears to be very fine grained and of poor reservoir quality. Deep resistivity measurements are consistently in the 3–5 ohm range and the gamma-ray measurements range from 75–90 API units. Estimated porosity from the density/neutron curves ranges from approximately 12–18%. Occasional weak oil shows were also present in the shallower Torok Formation, but the intervals appear to be of non-reservoir quality based on well logs and mud log descriptions. No core or production tests were gathered or attempted in this well.

BRPC began acquiring leases in the area in 2003. In 2005, they participated in the Ataruq 2 and 2A wells drilled by Kerr McGee. Ataruq 2 was drilled approximately 1½ miles north and east of the expansion area to a TD of 7,400 ft MD (−6,022 ft TVDSS) in the NE¼ Sec. 5, T11N, R8E U.M. The Ataruq 2A well was then sidetracked off the original wellbore to a bottom location approximately 1 mile west and drilled to a TD of 11,242 ft MD (−6,032 ft TVDSS) in the NE¼ Sec. 6, T11N, R6E, U.M. Both wells achieved the objective of penetrating and evaluating the primary targets within Cretaceous-age Brookian submarine fans, and the deeper Lower Cretaceous Kuparuk Formation before reaching TD in mudstone of the Early Cretaceous–age Miluveach Formation. Minor hydrocarbon shows were described on the mud logs within the Brookian interval in both wells. These intervals were generally sequences of inter-bedded siltstone, shale, and thin sandstone. The sandstones ranged from very fine to fine in grain size, with occasional rare medium sized grains. In the Ataruq 2 well, a total of twenty-two rotary sidewall cores were recovered from three distinct Brookian intervals; eight from 5,423–5,648 ft MD, nine from 6,216–6,264 ft MD, and five from 6,578–6,622 ft MD. A modular dynamic tester (MDT) tool recovered fluid samples from two of these zones. A sample from approximately 6,231 ft MD (−5,120 ft TVDSS) recovered water with a measured draw-down mobility of approximately 2 millidarcys/centipoise (md/cp) viscosity. A second sample from approximately 6,571 ft MD (−5,349 ft TVDSS) recovered gas and 40–43 °API oil (condensate) with a gas-to-oil ratio (GOR) of approximately 300,000 to 400,000 standard cubic feet of gas per stock tank barrel of oil (scf/stb). The measured draw-down mobility of the lower sample point was 3.5 md/cp. Overall, 15 MDT pressure points in the Brookian section measured draw-down mobilities ranging 0.09–3.5 md/cp and all but four points were less than 0.5 md/cp. The Kuparuk

Formation identified in both wells exhibited no oil shows and did not appear to be of reservoir quality.

In 2004, ConocoPhillips drilled the Placer 1 and 2—both deviated wells with bottom-hole locations 1–1½ miles west of the proposed expansion area. The primary objective for both wells was the Kuparuk C sandstone, and Placer 1 obtained whole core in the Kuparuk interval. The Placer 1 well was drilled to a TD of 7,761 ft MD and bottomed in the Miluveach Formation. The well penetrated 17 f t of Kuparuk C sandstone. Well logs indicate that much of the sandstone is siderite cemented. Core porosity averaged 17.2% and ranged from 6.3% in the siderite cemented zones up to 35.6% in the non-siderite cemented zones. Permeability measurements range from <1 md in siderite cemented zones up to 3,546 md in the non-cemented zones. The Placer 2 well was drilled to a TD of 9,118 ft MD and bottomed in distal Nuiqsut siltstones and mudstones. The Kuparuk interval in the Placer 2 well lacks reservoir sandstone, and is represented as a siderite-cemented hard streak atop LCU at 8,220 ft MD. A well-developed Nuiqsut sandstone was present at the top of the Nuiqsut interval (8,840–8,900 ft MD) that had good mudlog shows. Gamma ray values range 65–75 API units and the deep resistivity ranges 4–5 ohm-meters. The Nanushuk/Torok interval appears silty and shaly in both wells, but did yield mud log oil shows. No tests were conducted in either well. The Placer unit was formed in 2011, primarily to evaluate and develop the potential Kuparuk reservoir. In 2016, ASRC Exploration LLC successfully drilled and tested the Placer 3 well, which the Division certified as capable of producing in paying quantities in December 2016.

Multiple 3D seismic surveys have been shot in the past over portions of the existing SMU area by different companies. In 2008, BRPC shot approximately 200 square miles of proprietary 3D seismic south and east of the Colville River Unit. In 2011, BRPC acquired a license to the KRU WBA survey which covers the SMU and expansion area. BRPC has identified numerous exploration prospects and leads from interpretation of the seismic data. Most of the identified prospects are potential stratigraphic traps in Cretaceous-age, Brookian submarine fan deposits, but also include potential structural closures within Brookian top-set (shelf) strata and deeper stratigraphic prospects in the Lower Cretaceous Kuparuk Formation.

In 2011, BRPC drilled the North Tarn 1 well to a TD at 6,223 ft MD (approximately −6,125 ft TVDSS) in the SE¼ Sec. 2, T10N, R7E U.M. The bottom-hole location for this well is approximately 1 mile north of the KRU 2L-03 well drilled by ConocoPhillips in 2002. The primary target for the North Tarn 1 well was Cretaceous-age, Brookian submarine-fan turbidite sands similar to those producing in the KRU Tarn PA, approximately three miles to the south. A secondary deeper target was the hydrocarbon-bearing Kuparuk C sand originally penetrated, but never tested by the 2L-03 well. BRPC stated in an April 24, 2011 article published by the Petroleum News that minor gas and oil shows were encountered in the targeted Brookian intervals, but permeability was much lower than expected. In the same article BRPC further stated that the well encountered 20–25 feet of Kuparuk C sand with strong mud-gas shows, high oil-cut mud, and gas flow to surface tanks. The well experienced control issues for approximately seven days before mud losses and hydrocarbon flows from the Kuparuk Formation to surface tanks were stopped. Due to the well control issues, no well logs or core samples were gathered across the Kuparuk Formation. The original well bore was plugged and

then sidetracked as the North Tarn 1A approximately 600 feet to the northeast. The North Tarn 1A was then suspended after setting intermediate casing to a depth of 6,086 ft MD at the base of the Kalubik Formation, just above the Kuparuk C sand. BRPC returned to the North Tarn 1A sidetrack and continued drilling in January 2012. Upon completion, an acid stimulation treatment was performed on the Kuparuk C interval with recovered flow rates of approximately 40 barrels of oil per day (BOPD), 800 thousand cubic feet of gas per day (MCFD), and 75 barrels of water per day (BWPD). The well was suspended March 2012.

Brookian Potential

Many exploration wells were drilled in the Colville River Delta area between 1965 and the early 2000s. Several of these wells encountered prospective Brookian Torok Formation at depths between −4,000 and −6,000 ft TVDSS en route to deeper exploration targets such as the Kuparuk and Sadlerochit (Ivishak sandstone). Most of the wells that have evaluated the Torok Formation beyond basic logging and description of cuttings samples are located north of the SMU expansion acreage in what is now the OU and KRU near the DS-3S drilling pad. Wells in this area that encountered significant Torok reservoir interval included: the Sinclair Colville 1 well drilled in 1965–66; the Texaco Inc. Colville Delta 2 and Colville Delta 3 wells drilled in 1986; the ARCO Kalubik 1 well drilled in 1992; the ARCO Kalubik 2 well drilled in 1998; and the Pioneer Natural Resources Alaska Inc. (Pioneer) Oooguruk 1 and Ivik 1 wells drilled in 2003. Both the Colville Delta 2 and 3 wells produced completion fluids and minor oil during unstimulated well testes at very low flow rates and at very low bottomhole pressures. Following moderate fracture stimulation, the Colville Delta 3 well did produce an average of 240 stock tank BOPD during an 84-hour flow period. The Kalubik 1 well produced completion fluids and water during a 12-hour test without stimulation. An MDT sample recovered from ARCO's Kalubik 2 well yielded an oil gravity value of 19.8 °API, but the well was not flow tested. MDT measurements and fluid samples in the Torok interval within the Oooguruk 1 and Ivik 1 wells, drilled in 2003, indicated that both wells were water wet, although both showed the presence of hydrocarbons in the form of fluorescence of cutting samples and elevated cuttings gas on the mudlog.

In 2010, the ODSN-45 Nuiqsut development well within the OU was plugged and sidetracked as a horizontal producer in the Torok Formation near the Kalubik 2 well. Sustained oil production from the Torok ODST-45A well began in March 2010 and averaged approximately 530 BOPD over the following year. The Alaska Oil and Gas Conservation Commission (AOGCC) approved the establishment of the Oooguruk-Torok Oil Pool and pool rules in May 2011. The Division approved the formation of the Oooguruk-Torok Participating Area (OTPA) in the OU in June 2011 and includes horizontal production wells ODST-45A, & ODST-39 and horizontal injection well ODST-46.

As of July 31, 2017, The OTPA has produced a cumulative volume of approximately 860,000 barrels of oil. This production has primarily come from producers ODST-45A and ODST-39, with approximately 100,000 barrels of oil from the pre-production of the ODST-46 injection well. Currently, ODST-45A is the only producer online, and in July 2017 produced

approximately 145 BOPD with a 52% water cut (the percentage of water production to total fluid produced).

In 2012 & 2013, Pioneer drilled the high-angle to horizontal Nuna 1 & NDST 2 exploration wells to further delineate the Torok reservoir within the OU, approximately seven miles north of the SMU expansion area. After a 12-stage fracture stimulation with over 1.1 million pounds of proppant, an approximate 3,700 ft MD section of Nuna 1 tested at a rate of approximately 1,524 BOPD of 24 °API oil with 49% water cut. Based on these well and test results, the OU was expanded in 2014 to include the area delineated by the Nuna wells. Further development of the Torok at OU within the current OTPA or from the Nuna drill site is currently on hold due to market conditions.

In 2013, ConocoPhillips perforated and fracture-stimulated a portion of the Torok turbidite sequence within the existing KRU 3S-19 well and obtained flow rates of 250–300 BOPD. Subsequently, in 2015, ConocoPhillips drilled and fracture-stimulated horizontal well KRU 3S-620, 3½–4 miles north of the SMU expansion area. KRU 3S-620 tested at an initial rate of 1,575 BOPD with 75% water cut from a 4,200-foot horizontal section open to these turbidite sands. In 2016, CPAI drilled the KRU 3S-613 well as an offset water injection well to KRU 3S-620 to evaluate the ability to provide pressure support within the Torok reservoir and increase recovery. After establishment of the Kuparuk River Torok Oil Pool and Area Injection Order approved by the AOGCC, injection into KRU 3S-613 began in September of 2016. To date, there has been no conclusive flood response between the injection and producing well. KRU 3S-620 currently produces approximately 450 BOPD and approximately 1,500 BWPD, resulting in a 77% water cut. CPAI is still evaluating the current wells and commerciality of further Torok development.

Geology of the Torok Interval

The Torok reservoir within the KRU and OU is a combination structural-stratigraphic trap. The Torok in this area and the SMU expansion area is part of an east to southeastward dipping monocline. There are several minor northwest trending normal faults in the area and a major down-to-the-east northwest-southeast trending fault between the Kalubik 1 and Colville Delta 2 wells. This major fault defines the northeast edge of the OTPA and stratigraphically isolates the down dip water wet Torok formation east of the Texaco Colville Delta 2 well. The western edge of the OTPA is defined by the stratigraphic closure due to sandstone onlap onto the toe of slope. The southern extent of the established Torok Oil Pools is roughly defined by the interpreted extent of the oil column above a potential oil-water contact (OWC), as interpreted by ConocoPhillips.

The Torok formation is a time-transgressive unit of Albian to Cenomanian in age and forms a complex series of interbedded sandstone, siltstone, and mudstone deposits that record complex interaction of deposition, sedimentation, subsidence, sea-level changes, and erosion along a shelf edge margin during the middle Cretaceous. The resultant sedimentary deposits record the interplay of changes in sea level, subsidence, and sedimentation and accompanying depositional patterns of progradation, regression, and aggradation. Within the defined Torok Oil Pool within

the OU and KRU, the Torok interval consists of lower Cretaceous-aged, Brookian slope-to-basin turbidite deposits comprised of thinly laminated claystone, mudstones, siltstones, and very fine-grained sandstones. The entire Torok interval varies in thickness up to about 640 ft, but generally thins towards the southeast and southwest. The interval is informally divided into two members: the younger, upper Torok with generally higher sand concentrations and the older, lower Torok, which commonly does not exhibit favorable reservoir characteristics. The most prospective Torok reservoirs in the area are toe of slope and basin floor turbidite fan deposits which consist of very finely interbedded mudstones, siltstones and sandstones. It is difficult to correlate individual beds, which range from less than an inch thick to only several feet—it is far easier to define and correlate the entire interval. Individual beds are interpreted to be laterally continuous within the individual turbidite lobes. These turbidite fan lobes, or lobe complexes generally onlap and pinch-out against the paleo-shelf slope to the west, which may provide the up-dip stratigraphic trap. Whole core data analyzed from the Colville Delta 3, Kalubik 2, and Moraine 1 wells north of the SMU expansion area indicate that the coarser fractions are composed of coarse silt to very fine sand sized grains that vary 20–50% quartz, 10–25% feldspar, 5–40% clay, and 15–30% lithic fragments. Minerology is likely to vary between various lobe complexes due to the turbidite sediments being sourced and transported from different portions of the paleo-shelf. Differing minerology is also likely to have an impact on reservoir quality of the interval. Sandstone porosity measured from existing core range 12–26% with an average of 19%. Sandstone permeability ranges <0.1–100 md, averaging 4 md. Water saturation estimates for the reservoir siltstones and sandstones range 30–85%.

No conclusive OWC is identified within the established OU and KRU Torok Oil Pools. The lowest known oil is defined in the Colville Delta 3 well, which tested oil down to a depth of −5,150 ft TVDSS. The highest known water for the Oooguruk Oil Pool is established by MDT measurements in the Ivik 1 well at −5,212 ft TVDSS. In the KRU Torok Oil Pool, ConocoPhillips testified that there was mobile water present beginning at a depth of −5,190–−5,275 ft TVDSS. This free-water may take the form of a single OWC, unique OWCs in different turbidite lobes, or a wide transition zone of mobile water and oil above as-yet undefined OWC(s) due to the very fine-grained nature of the reservoir.

Oil production from the Torok Formation in both the OTPA and neighboring KRU is marked by elevated production of formation water. Producing wells in the OTPA generally produce at 35–60% water cut. To the south and slightly down dip in the KRU, the KRU 3S-19 & KRU 3S-620 wells both produce oil with water cuts in the 55–80% range. Further to the south, in the area of the proposed SMU expansion, data suggests that the Torok interval can be expected to be approximately 100–250 ft structurally deeper than at KRU, increasing the risk of the interval being wet.

Kuparuk C Reservoir Potential

Regional structure at the Kuparuk/LCU stratigraphic level is dominated by the Colville High, an extremely large, roughly circular, four-way closure that constitutes a major segment of the Barrow Arch. The proposed SMU expansion acreage is located on the southwestern flank of the Colville High. At a finer scale, numerous northwest-southeast striking faults exert important

control on the presence or absence of reservoir sandstones, both by syndepositional faulting creating accommodation, and by post-depositional faulting preserving reservoir sands from erosion. The trapping mechanism for Kuparuk sandstones within the regional Colville High closure is thought to be primarily structural with deposition and erosion controlling the distribution of reservoir.

The Kuparuk C sandstone is one of the major reservoirs on the North Slope with a long history of production from numerous fields, most notably within the KRU. The sandstones were deposited on a shallow marine shelf in paleo-topographic lows that formed, primarily as a result of late Jurassic and Cretaceous aged rift faulting. This depositional setting results in dramatically variable sand thicknesses and aerial extent of individual sand bodies. The sandstones were deposited directly above the LCU, one of the major unconformities on the North Slope. The sandstone in the Kuparuk C interval is believed to be sourced primarily from erosion of older sandstones that subcrop below the LCU. Within the KRU, erosion and re-working of the underlying, aerially pervasive Kuparuk A sandstones provided much of the source sediments, though increased chert content in the Kuparuk C sandstones argues for contribution from provenance areas with Ivishak and older Ellesmerian formations exposed at the LCU. Outside the KRU, Kuparuk C sandstone is distributed irregularly. Siderite cementation and glauconite content are the primary controls on reservoir quality, causing great variability in porosity and permeability. Core data reveal that porosity can range from 8% to 30% and permeability can range from less than 0.1 md to over 3,000 md. In areas with little cementation the Kuparuk C sandstone has demonstrated the capability to produce at very high rates from relatively thin sandstones.

Numerous smaller accumulations of Kuparuk C sandstone have been discovered and developed outside the KRU. Kuparuk C sandstone is in production to the north within the OU and two separate accumulations in the CRU (Fiord-Kuparuk and Nanuq-Kuparuk PAs). The Kuparuk C reservoir at the Mustang project in the SMU is currently under development, and the interval is the key objective in the Placer Unit and one of the discovered reservoirs within the Pikka Unit

The Placer unit was formed in 2011, primarily to evaluate and develop the potential Kuparuk reservoir. In 2016, ASRC successfully drilled and tested the Placer 3 well, which was then certified by the Division as capable of producing in paying quantities. ASRC is currently evaluating progressing Placer into development. Although the primary objective of the nearby Colville 1, Kookpuk 1, Ataruq 2, and Ataruq 2A wells was not the Kuparuk C interval, all of these wells penetrated and evaluated the interval with petrophysical well logs. Based on the well logs and description of cuttings samples, none of these other wells encountered reservoir-quality Kuparuk C sand.

BRPC has integrated available subsurface control from well data with various seismic attributes to predict the presence of Kuparuk C sandstone within the proposed unit and expansion acreage. Seismic data was primarily used in an attempt to directly detect reservoir-prone sandstone using seismic attributes. Kuparuk C sandstone generally displays high impedance that may produce a strong peak amplitude anomaly above the LCU when present. However, due to interference effects of different underlying sub-cropping strata and the limits of seismic data to resolve both

the top and the base of the sandstone when the interval is thin, the amplitude patterns can be complex and sometimes misleading. This can be further complicated by the common presence of dense secondary siderite cement, either in the Kuparuk sandstone or in thin transgressive lags deposited at the unconformity, which can give a strong amplitude signature, but result in significantly diminished reservoir quality.

Conclusion

For a unit expansion, the SMU unit agreement requires BRPC to demonstrate a reservoir that extends from the existing unit into the proposed expansion area or that the expansion area will facilitate production. BRPC must also demonstrate that with the expansion, the unit would remain the minimum area necessary to include all or part of one or more reservoirs or potential hydrocarbon accumulations. 11 AAC 83.356(a). Thus, in reviewing the Application, the Division looked at whether BRPC had demonstrated a reservoir or potential hydrocarbon accumulation in the expansion area, including whether BRPC had demonstrated a reservoir extending from SMU into the proposed expansion area. A reservoir is an accumulation discovered by drilling and evaluated by testing that is separate from other accumulations. 11 AAC 83.395(6). A potential hydrocarbon accumulation is a "structural or stratigraphic entrapping mechanism which has been reasonably defined and delineated through geophysical, geological, or other means and which contains one or more intervals, zones, strata, or formations having the necessary physical characteristics to accumulate and prevent the escape of oil and gas." 11 AAC 83.395(5).

BRPC provided the Division a comprehensive interpretation and analysis of the available data in support of the application to expand the SMU. The application included interpretations of 3D seismic data, seismic attribute analysis, structure maps, well correlations, geologic cross sections, interval isopachs, integrating seismic and well data, interpreted well logs, and proprietary petrophysical analyses from wells within the proposed unit and surrounding area.

Because no wells have yet to discover and test a hydrocarbon reservoir in the proposed expansion area, BRPC has applied for the expansion based on the interpreted prospectivity of the Cretaceous Brookian strata, particularly slope and basin-floor fan deposits in the Torok Formation, and the prospect of additional accumulation of reservoir quality Cretaceous Kuparuk C sand beyond the existing SMU. The proposed expansion would add approximately 21,472 acres to the north and west of the current SMU.

Based on evaluation of the available data submitted by BRPC, the Division acknowledges the chance of reservoir quality hydrocarbon accumulations existing within either the Torok Formation or Kuparuk C sand in the proposed expansion area. Both are reasonable prospective plays. Both have inherent risks that would require additional exploratory wells to evaluate. Encountering low reservoir quality and unacceptably high-water saturation are the largest risks to a viable Torok development in the SMU Expansion area. For this reason, not only would a well need to be drilled and cored to determine reservoir quality, but a flow test would be needed to determine producibility and water cut. In the Kuparuk C, the thin and highly variable nature of the presence and reservoir quality makes prospecting difficult short of drilling additional wells.

Although BRPC has identified prospectivity within the expansion acreage, no prospects have been developed to the level of identifying specific exploration well locations nor specific well plans that include data gathering and evaluation plans. Accordingly, the prospects are not sufficiently delineated to qualify as potential hydrocarbon accumulations and therefore the unit, as expanded, would not be the minimum size necessary to encompass potential hydrocarbon accumulations. Nor has BRPC demonstrated a reservoir that extends from the existing unit into the proposed expansion area to qualify for a unit expansion under the terms of the unit agreement.

3. Plans of Development

The POD BRPC submitted in support of its Application describes a generalized idea for exploration and potential development of the expansion acreage, but does not provide much detail or make firm, concrete work commitments. In this respect, it is more of a concept than a POD. BRPC states that, long-term, it plans to develop the expansion area by installing a 15-acre gravel pad that can accommodate up to 40 wells, then transport produced fluids to the Mustang Pad in the existing SMU for processing. BRPC's short-term plans are limited to planning work: studying existing seismic and subsurface data, monitoring production from neighboring units, and a topographical survey. None of those activities constitute exploration or development operations. It is not until early 2019 that BRPC might start drilling. Even then, BRPC offers no specific commitment to drill any particular number of wells or by any particular date or any particular depth or location. Rather, BRPC conditions its drilling plans on the outcome of studying analogous wells in neighboring units. In other words, BRPC is saying that it will wait and see if other operators are successful in the area, and only then will it consider moving forward with developing the expansion area.

With its lack of detail and work commitments, BRPC's POD does not demonstrate that the expansion would facilitate production from the unit, as required for an expansion under Article 13.1 of the unit agreement.

The purpose of a unit is to conserve resources through joint development, not to warehouse acreage for a hypothetical development of unknown resource potential with no specific plans to timely pursue the resource. A POD that commits to a specific, timely development program can support the formation or expansion of a unit. The lack of specificity and concrete work commitments in BRPC's POD, however, fails to support this expansion.

4. The Economic Costs and Benefits to the State and Other Relevant Factors

Oil and gas production provides economic benefits to the State through royalties and taxes on production. But production from the expansion area is neither inevitable nor imminent. BRPC itself states that for the expansion area, "hydrocarbons are likely only marginally economic at today's cost and price structure on the North Slope," calling into question whether BRPC would move forward with developing this area. Nor is it certain that there are resources to develop. As discussed above, BRPC has not provided data to show a reservoir or potential hydrocarbon accumulation in the proposed expansion or extending from SMU into the proposed expansion.

And BRPC's plans for the expansion area include no firm commitments to drill that area. At most, BRPC might drill starting in 2019, but when, where, and what it might drill and how likely that is remain open questions. With no evidence of a potential hydrocarbon accumulation or concrete plans for confirming the resource potential, the economic benefit the Application offers is little different from the potential economic benefit inherent in any oil and gas lease.

Expanding the unit poses economic costs to the State because unitization would extend the leases without definite, imminent plans for production. Without unitization through this proposed expansion, some of the leases are past their primary term and will expire. For those leases, the State stands to receive bonus bids by re-leasing the acreage. To instead include that acreage in SMU poses an economic cost to the State. For the leases still in their primary term, the working interest owners will need to find another basis for extending the leases, all of which involve conducting work on the leases that could lead to development. AS 38.05.180(m). The State would lose out on that development work and resulting economic benefit from eventual production if the leases are instead included in SMU without definite work commitments. In that respect, expanding the unit could actually delay development of the expansion area, which poses an economic cost to the State.

B. Decision Criteria considered under 11 AAC 83.303(a)

1. Promote the Conservation of All Natural Resources

A unit may be formed "[t]o conserve the natural resources of all or a part of an oil or gas pool, field, or like area," which means "maximizing the efficient recovery of oil and gas and minimizing the adverse impacts on the surface and other resources." AS 38.05.180(p); 11 AAC 83.395(9). The unitization of oil and gas reservoirs or accumulations and the formation and expansion of unit areas to develop hydrocarbon-bearing reservoirs or accumulations are well-accepted means of hydrocarbon conservation. Unitization, with development occurring under the terms of a unit agreement, can promote efficient evaluation and development of the State's resources and minimize impacts to the area's cultural, biological, and environmental resources. These benefits of unitization only come to fruition when an operator develops the unit. BRPC's Application does not confirm that there is a resource to develop in the expansion area or provide concrete plans to confirm resources through definitive drilling commitments.

As discussed above, BRPC's vague long-term plans also include installing a pad and roads in the expansion area, similar to what a development project in that area might look like if it was developed separately from SMU. Thus, from the Application BRPC provided, it does not appear that expanding SMU would significantly decrease surface impacts compared to developing this acreage separately from SMU.

2. The Prevention of Economic and Physical Waste

Economic waste is often referred to as the drilling of wells in excess of the number necessary for the efficient recovery or delineation of the oil and gas in place. Physical waste, among other things, includes the inefficient, excessive, or improper use of, or unnecessary dissipation of,

reservoir energy. Unitization may prevent economic and physical waste by eliminating redundant expenditures for a given level of production, or by avoiding loss of ultimate recovery with the adoption of a unified reservoir management plan.

BRPC's Application does not indicate that expansion would prevent economic or physical waste. As discussed above, the data does not demonstrate a reservoir or potential hydrocarbon accumulation in the expansion area, let alone a reservoir extending from SMU into the expansion area. If there were resources in the expansion area, developing them jointly instead of lease-by-lease could prevent waste. But without data showing a reservoir across SMU and the expansion area, the Application fails to show the potential for a unified reservoir management plan to prevent physical waste.

The Application does not necessarily demonstrate prevention of economic waste either. BRPC intends to install a pad, pipelines, and roads in the expansion area, similar to what it would install if that area was developed separately from SMU. The one redundancy BRPC hopes to avoid is installing a separate processing facility in the expansion area. If BRPC installed a processing facility at the Mustang pad and if BRPC located hydrocarbons in paying quantities in the expansion area and processed them at the Mustang pad, it would avoid the economic waste for BRPC of installing a separate processing facility in the proposed expansion area. But with no facility at Mustang and no proven resource in the expansion area, this potential economic waste remains highly speculative. And without information about a reservoir, it is difficult to know whether BRPC's plan to process both the expansion area and the existing SMU at the same facility is a viable one. Furthermore, unit expansion is not the only way to prevent this possible economic waste; BRPC could also avoid a redundant processing facility through a facility sharing arrangement, particularly since the SMU and expansion area working interest owners are the same.

3. The Protection of All Parties of Interest, Including the State

The people of Alaska have an interest in the development of the State's oil and gas resources to maximize the economic and physical recovery of the resources, AS 38.05.180(a). Expanding the unit without definitive plans to develop the area does not protect that interest. Denying the expansion, on the other hand, allows the State to re-lease expired acreage to working interest owners who will have incentives to develop the acreage in a timely manner to keep leases from expiring, and incentivize working interest owners of the unexpired acreage to do the same. Denying the expansion thus protects the State and public interest in maximizing economic and physical recovery.

The State also has an interest in minimizing adverse impacts from oil and gas development. As discussed above, BRPC's expansion concept poses a comparable surface impact to developing the expansion area separately from the existing unit. The expansion thus offers no significant protection of the State's environmental interest as compared to separate development.

Expansion would protect the interests of the working interest owners of the leases that are past their primary term and do not have a basis for extension absent this expansion. But while

unitization can extend the term of a lease, lease extension is a side-effect of unitization, not its purpose. Expansion would presumably protect BRPC's interests as well by expanding the scope of its operating duties.

V. FINDINGS AND DECISION

1. The Division complied with the public notice requirements of 11 AAC 83.311. The Division received one public comment, from AIDEA, supporting the proposed expansion.

2. The working interest owners of the proposed expansion area are already signatories to the SMU unit agreement and unit operating agreement. Thus, there are no additional parties to join the unit.

A. The Proposed Expansion Does Not Meet the Requirements for a Unit Expansion

1. The SMU Unit Agreement, Article 13.1, specifies that an expansion is limited to lands that overlie a reservoir that is at least partially within the unit area or lands that facilitate production from the unit area. A unit must also encompass the minimum area necessary to include all or part of a reservoir or potential hydrocarbon accumulation.

2. The Division reviewed geological, geophysical, and engineering data related to the proposed expansion area and was unable to conclude that this acreage contains a reservoir that extends from the existing SMU or that the proposed expanded unit would encompass the minimum area necessary to include all or part of a reservoir or potential hydrocarbon accumulation.

3. The proposed POD does not include plans for the expansion area that would facilitate production from the existing SMU unit area.

4. Because the Application does not demonstrate that the expansion area includes a reservoir extending from the existing unit or that the expansion area would facilitate production from the existing unit, the Application does not meet the unit agreement requirements for a unit expansion.

5. The Application does not demonstrate a resource that is sufficiently defined and delineated to qualify as a potential hydrocarbon accumulation and does not provide evidence of a reservoir, and therefore the Application fails to show that the proposed expanded unit would be the minimum area necessary to encompass all or part of one or more reservoirs or potential hydrocarbon accumulations.

B. The Application Does Not Demonstrate Conservation of Natural Resources

1. BRPC's proposed POD states that it might drill in the expansion area in early 2019, but does not commit to doing so or commit to any particular number of wells, drilling depth or location, or deadlines.

2. Because the proposed expansion area does not necessarily contain a reservoir or potential hydrocarbon accumulation to develop and BRPC offered no firm, timely commitments to confirm the resource potential and develop it, the Application does not demonstrate that the expansion would conserve the oil and gas resources.

3. BRPC's concept for the expansion area includes a pad, roads, and pipelines, similar to what a development project might be if the area was developed separately from the existing SMU. BRPC hopes to process expansion area production at a hypothetical facility in the existing unit, but the Application does not demonstrate that this would result in less surface impact to the expansion area than if BRPC installed a processing facility on the proposed expansion-area pad. Even if BRPC was able to install a smaller pad in the expansion area by processing production at the Mustang pad, BRPC could also do this through a facility sharing arrangement, approved by the State, rather than unit expansion.

C. The Application Does Not Demonstrate Prevention of Economic and Physical Waste

1. Because the proposed expansion area does not necessarily contain resources to develop and BRPC offered no firm, timely commitments to develop the potential resources, the Application does not demonstrate that the proposed expansion would prevent physical waste through unified reservoir management.

2. BRPC's concept for the expansion area involves installation of a pad, roads, and pipelines similar to what would be installed for a development that is separate from the existing SMU. BRPC does hope to process production from the expansion area at a processing facility at the Mustang pad, which would prevent economic waste for BRPC. But that plan remains highly speculative. There is no processing facility at Mustang. There is no established reservoir or potential hydrocarbon accumulation in the expansion area. There is no information from which to conclude that the hypothetical Mustang facility would be sufficient to process additional production from the expansion area. There are so many unknowns that the Application fails to demonstrate that unit expansion would prevent economic waste.

D. The Proposed Expansion Protects BRPC and the Working Interest Owners, but not the Public or the State

1. Expanding the unit would extend the leases in the expansion area, protecting the working interest owners' interests in those leases.

2. Expanding the unit might protect BRPC's interests as operator of the expanded unit.

3. Because the proposed expansion area does not necessarily contain resources to develop and BRPC offered no firm, timely commitments to develop, the proposed expansion does not protect the State and public interest in maximizing development of the State's oil and gas resources and maximizing economic and physical recovery of resources.

4. Because BRPC's concept for the expansion area offers little to no reduction in potential environmental impact as compared to developing the area separate from the existing unit, the proposed expansion does not protect the State's interest in minimizing adverse impacts from oil and gas development.

For the reasons discussed in this Findings and Decision, I hereby deny the proposed unit Expansion.

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. 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 any questions regarding this decision, contact Becky Kruse with the Division at 907-269-8799, or by email at Becky.Kruse@Alaska.gov

James B. Beckham, Deputy Director
Division of Oil and Gas