PRUDHOE BAY UNIT
BOREALIS AND ORION PARTICIPATING AREAS

PARTIAL APPROVAL OF THE BOREALIS AND APPROVAL OF THE ORION 2012 PARTICIPATING AREA PLANS OF DEVELOPMENT

FINDINGS AND DECISION OF THE DIRECTOR,
DIVISION OF OIL AND GAS UNDER DELEGATION OF AUTHORITY
FROM THE COMMISSIONER,
DEPARTMENT OF NATURAL RESOURCES, STATE OF ALASKA

SEPTEMBER 28, 2012

TABLE OF CONTENTS

I. DECISION SUMMARY 3

II. INTRODUCTION AND BACKGROUND 3

A. Introduction 3

B. Borealis Participating Area History 4

C. Orion Participating Area History 8

III. REGULATIONS AND UNIT AGREEMENT PROVISIONS REGARDING PLANS OF DEVELOPMENT 12

IV. APPLICATION OF 11 AAC 83.303(b) DECISION FACTORS 15

V. APPLICATION OF 11 AAC 83.303(a) DECISION CRITERIA 17

VI. FINDINGS AND DECISION 19

VII. ATTACHMENTS 21

I. DECISION SUMMARY

On September 30, 2011, BP Exploration (Alaska) Inc. (BP), as Operator of the Prudhoe Bay Unit (PBU), on behalf of itself and the other PBU Working Interest Owners (WIOs), Chevron U.S.A. Inc., ConocoPhillips Alaska, Inc., and ExxonMobil Alaska Production Inc., submitted plans of development (PODs) for the Borealis participating area (PA) and for the Orion PA for 2012 to the Department of Natural Resources (DNR), Division of Oil and Gas (Division). By letter dated October 10, 2011, the Division notified BP that the PODs were incomplete for failure to propose development in the northwestern portions of the PAs. After the Division extended the deadline for submittal of an acceptable POD and met with BP several times, BP on August 7, 2012, submitted to the Division a supplement to the Borealis and Orion PODs that continued to defer development of the northwestern portion of Borealis, but committed to significant work in the northwestern portion of Orion.

The Division approves the 2012 Borealis and Orion PODs for the period October 1, 2012 through December 31, 2012, except with regard to Borealis PA tracts 14, 15, and 16 in the northwestern portion of the PA. BP has not followed through with the development commitments made to induce DNR to approve expansion of the Borealis PA to include tracts 14, 15, and 16. These include construction of the I-Pad and the drilling of multiple production and injection wells. BP has failed to follow through with these commitments notwithstanding repeated requests from DNR to comply. While tracts 15 and 16 in the northwestern portion of the Orion POD suffer from the same defects, the Division nevertheless approves the Orion POD in total because BP has committed to do significant work during the 2012 plan period to improve the capability of production facilities to handle viscous and sand-laden oil of the Orion PA.

II. BACKGROUND

A. Introduction

The PBU is located on the North Slope of Alaska and currently encompasses all or part of 115 State of Alaska Oil and Gas Leases and approximately 254,235.32 acres. DNR approved formation of the unit on April 1, 1977. The PBU includes two Initial Participating Areas (IPAs), one for the Oil Rim and one for the Gas Cap, from which PBU was originally produced, plus eleven additional PAs for separate hydrocarbon accumulations that are divided into two regional groups called the Western Satellites and the Greater Pt. McIntyre Area. The Borealis and Orion PAs are part of the Western Satellites.

Prior to the implementation of the single operatorship at PBU in 2000, BP and Phillips Alaska, Inc. (Phillips) managed the Prudhoe Bay West End Development Project that includes the Borealis and Orion reservoirs. The BP project, known as the Eileen West End Flood Development Project, was planned to supply produced water and miscible injectant to W and Z-Pads, via new pipelines originating from Gathering Center 2 (GC-2), a production processing center. The Phillips' project, the Western Region Development Project, was a multi-year plan to develop the Western Region of the PBU. *See* Attachment 1. Phillips presented its development plan to the agencies in 1999-2000, received project permits in March 2000, and constructed the

V and L-Pads. In October 2000, BP became the sole operator of the PBU and combined both plans into the Prudhoe Bay West End Development Project.

This decision regards the PODs for the Orion and Borealis PAs in the western portion of the PBU. The central and southern portions of both PAs have been drilled or are in production. At issue are the northwestern portions of these PAs, more specifically the portions of unit tracts 14, 15, and 16 that underlie Borealis and the portions of unit tracts 15 and 16 that underlie Orion. BP has failed to follow through with the development commitments made for these portions of the PAs. When BP applied to expand the Borealis PA and to form the Orion PA to include unit tracts 14, 15, and 16, it represented that it would have the area in production by 2006 from wells drilled from a proposed I-Pad. But BP has failed to follow through with the development.

The Borealis PA produces from the Cretaceous Kuparuk Formation and underlies the Orion PA which produces from the Late Cretaceous Schrader Bluff Formation. Orion tract allocations are based on original oil-in-place (OOIP). Orion tract allocations for tracts 15 and 16 combined is 32.45 percent. The Alaska Oil and Gas Conservation Commission (AOGCC) Conservation Order No. 505 states that the total OOIP for the Orion PA is 1,070-1,785 million standard tank barrels (MMSTB), with a recovery factor of 20 percent for primary depletion and up to 25 percent with waterflood. That gives a range of 69 to 144 MMSTB recoverable oil in the I-Pad area of Orion (tracts 15 and 16). BP's John Minge was quoted in the Petroleum News Vol. 17, No. 2 *Pumping Up TAPS: Fastest source: legacy fields*, that "I-Pad alone will result in drilling some 50 new wells to access about 80 million barrels of additional reserves."

Borealis tract allocation for OOIP for tracts 14, 15, and 16, in the vicinity of the I-Pad, is 6.05 percent. AOGCC Conservation Order No. 471 states the total OOIP for Borealis PA ranges from 195 to 277 MMSTB with a waterflood recovery factor of 23 percent. This gives an estimated range from 2.7 to 3.9 MMSTB of recoverable oil in the I-Pad area of Borealis (tracts 14, 15, and 16).

The central and southern portions of the Orion PA produce primarily from a reservoir interval of the Orion PA known as the Schrader Bluff O-sands. The northwestern portion of the Orion PA at issue here is projected to produce from a different reservoir interval – the Schrader Bluff N-sands, which overlies the O-sands. The N-Sand contains viscous oil and the sands are poorly consolidated resulting in production of sand with the oil.

B. Borealis Participating Area History

On August 30, 2002, DNR approved the formation of the Borealis PA, effective retroactive to November 1, 2001. The Borealis PA consisted of all or a portion of five state leases covering approximately 7,760 acres. *See* Attachment 2. At the time of the application to form the Borealis PA, approximately 18 wells had already been drilled and completed in the Borealis Reservoir (Kuparuk Formation) in the central portion of the proposed PA. As of June 2002, fourteen wells were producing from the Borealis Reservoir as tract operations in the central portion of the proposed Borealis PA. By August 2002, 25 wells had been drilled from the L and V-Pads within the central portion of the proposed Borealis PA with a total production of approximately 28,620 barrels of oil per day (BOPD). The POD BP filed with its application to

form the Borealis PA indicated that Borealis PA development would include a total of approximately 20 to 50 production and injection wells drilled from the L and V-Pads.

On April 29, 2004, BP submitted an application to expand the Borealis PA to include ADLs 25637, 47446, and 47447 in a northern expansion area (I-Pad) and 28238, 28240, 28245, 28262, 47450, and 47453 in a southern expansion area (Z-Pad). *See* Attachment 3. The northern expansion area includes tracts 14, 15, and 16. BP stated that development and production of the northern expansion area required construction of a new drilling pad designated the "I-Pad" in order to reach the reserves in the northwestern portion of the PA. BP represented that the I-Pad would be constructed and in operation by 2006.

On June 15, 2004, BP submitted supplemental information in support of the Borealis expansion application. The Northern Expansion Area Geoscience and Plan of Development stated that development well locations and type are subject to future planning and optimization, but the number of wells proposed in the northern Borealis PA expansion area was in the range of 5 to 15 wells.

On October 1, 2004, BP submitted the Fourth POD for the Borealis PA that stated that the I-Pad was in the permitting stage, and that two appraisal wells were planned by 2005. This meant that BP planned on drilling the reservoir under tracts 14, 15, and 16 to appraise the reservoir by 2005.

On December 22, 2004, DNR approved the expansion of the Borealis PA, effective December 1, 2004. The expansion included both a northern expansion area within ADLs 25637, 47446, and 47447 (approximately 3,355 acres) and a southern expansion area within ADLs 25637, 28238, 28240, 28245, 28262, 47450, and 47453 (approximately 5,293 acres). *See* Attachment 3. As of December 2004, there were a total of 41 production and injection wells from PBU L, V and Z-Pads producing approximately 32,000 BOPD from the Borealis Reservoir. Six of the 41 wells operated as injector or producer PBU Borealis Tract Operations which means they were outside the Borealis PA. In September of 2004, these 6 wells had a combined production rate of approximately 5,620 BOPD. None of these wells were located on or produced from the reservoir underlying Borealis tracts 14, 15, or 16. The I-Pad was needed to put those tracts into production. BP planned to drill 5 to 15 wells from the I-Pad.

On October 5, 2005, BP submitted the Fifth POD for the Borealis PA. It did not address the I-Pad or development of the Borealis PA northern expansion area.

By letter dated October 14, 2005, the Division notified BP that the proposed Borealis Fifth POD was incomplete and did not meet the requirements of 11 AAC 83.343. The POD neither addressed the I-Pad nor the wells that BP said it would drill. The Division requested BP to resubmit a Fifth POD that addressed development of the northern expansion area. The DNR letter indicated that BP needed to file an acceptable POD for the Borealis PA to avoid possible default of the PBU agreement, contraction of the Borealis PA, or other action under the unit agreement under Article 4.3 of the PBU Agreement.

On November 30, 2005, BP responded stating that changes to the state's severance tax impacted the construction of the I-Pad and the wells BP had proposed drilling. More specifically,

development activities were negatively impacted by changes to the Economic Limit Factor ("ELF"). BP was reconsidering the economics of the proposed northwest Borealis PA development.

On December 7, 2005, the Division sent BP a letter indicating that the Fifth Borealis PA POD deviated from the development plans of the Fourth POD without sufficient explanation or justification. The Division notified BP the Fifth POD was still incomplete, and requested BP to explain how the changes to the ELF impacted development and drilling plans for the northwestern portion of the Borealis PA. DNR also agreed to meet with BP to discuss the matter and to receive a presentation.

On January 17, 2006, BP gave a technical presentation to the Division that supplemented the Fifth POD. BP indicated that it planned to drill a well designated I-100 in March 2006 in the northwestern expansion area. BP also stated that it wanted to develop the northwestern portion of the Borealis PA in conjunction with development of the northwestern portion of the Orion PA. On February 27, 2006, the Division found the Fifth POD, as supplemented by meetings with and information from BP, met the criteria set out in 11 AAC 83.343 and approved the Fifth POD for the period of January 1, 2006 through December 31, 2006 noting that BP planned to drill the I-100 well in about two months.

On July 11, 2006, the Division approved tract operations to drill and complete the V-121 well for water and miscible injectant in the Borealis Reservoir within ADL 47450, outside the Borealis PA.

On October 4, 2007, BP filed an Application to Expand the Borealis PA. The V-121 well supported existing production from wells V-122 and V-106A, which were producing moveable hydrocarbons from outside the then existing Borealis PA. The Division approved the approximate 432-acre expansion effective January 1, 2008. *See* Attachment 4.

On October 4, 2006, BP submitted the Sixth POD for the Borealis PA. BP was still evaluating installation of the I-Pad. Gravel placement on the proposed I-Pad location could not begin in summer 2006 because the I-100 ice pad constructed in winter 2006 had not sufficiently melted. The schedule for excavation changed to begin in winter 2007-2008, followed by gravel placement. Gravel placement would require one year of in-place de-watering before drilling rigs could safely occupy the pad. Under this schedule, I-Pad development drilling would not commence prior to 2009. On December 29, 2006, based on the criteria and requirements set out in 11 AAC 83.303 and 11 AAC 83.343, the Division approved the Sixth POD for the Borealis PA for the period of January 1, 2007 through December 31, 2007.

On October 4, 2007, BP submitted the Seventh POD for the Borealis PA. The I-Pad project completed Select Stage engineering in the second quarter of 2006 and began Define Stage engineering in October 2006. Define Engineering included geotechnical site investigation and the drilling of thirteen shallow boreholes at the proposed I-Pad location. This investigation determined that the original planned I-Pad location partially coincided with a large subsurface ice lens that posed significant geotechnical, hydrology, and drilling issues. Work was underway to design a new I-Pad location, north of the ice lens. On December 13, 2007, the Division

approved the Seventh POD for the Borealis PA for the period of January 1, 2008 through December 31, 2008.

On September 30, 2008, BP submitted the Eighth POD for the Borealis PA. I-Pad Define Engineering was completed for the revised surface location, resolving the geotechnical concerns raised by the presence of the ice lens at the original pad location. Evaluation of I-Pad development focused on the ability of the GC-2 facility to handle viscous Orion Reservoir production, Orion N-sand production, and completion technology. On December 15, 2008, the Division approved the Eighth POD for the Borealis PA for the period of January 1, 2009 through December 31, 2009.

The Ninth and Tenth Borealis PA PODs submitted in 2010 and 2011 did not provide any development plans for the I-Pad project or drilling of the proposed wells on Borealis tracts 14, 15, and 16. Instead, the PODs detailed other Borealis PA work and stated that the I-Pad project was deferred. The Division approved the Ninth and Tenth Borealis PA PODs respectively on November 17, 2009 for the period January 1 through December 31, 2010 and October 28, 2010 for the period January 1 through December 31, 2011.

On September 30, 2011, BP submitted the Eleventh Borealis PA POD that discussed Borealis activities generally. BP's position with regard to the I-Pad had not changed. The project continued to be deferred. No activities were proposed to install the I-Pad or to drill the proposed wells on tracts 14, 15, and 16.

On October 10, 2011, the Division informed BP that the Eleventh Borealis PA POD was incomplete for failure to set out development plan for installation of the I-Pad and the drilling of the wells that BP had proposed as the basis for the expansion of the Borealis PA to include tracts 14, 15, and 16. In order for the Division to accept the Eleventh POD as complete, the POD needed to address development of the Borealis Reservoir underlying unit tracts 14, 15, and 16.

On December 13, 2011, BP responded stating that the Borealis PA accumulation in the I-Pad project area is minor compared to the overlying Orion PA accumulation in the same area. BP wanted development of Borealis tracts 14, 15, and 16 to be deferred until it developed the viscous and sand-laden crude of Orion tracts 15 and 16.

On December 30, 2011, February 29, March 30, and April 26, 2012, DNR extended the expiration dates of the Eleventh Borealis PA POD in order to allow for additional discussions between the Division and BP about development of the northwestern portion of the Borealis PA and to provide BP with the opportunity to submit an I-Pad development project. Meetings with BP were held on January 9, March 29, and May 17, 2012.

By letter dated May 24, 2012, the Division again notified BP that the Eleventh Borealis PA POD would probably not be acceptable unless it provided for the development of tracts 14, 15, and 16 in the northwestern portion of the PA, that portion of the PA that BP in 2004 had proposed plans to produce from I-Pad by 2006 in return for the Division's approval of the expansion of the PA in 2004 to include those tracts. The letter also advised BP that if it failed to provide for

development of tracts 14, 15, and 16, that the PA could be contracted to exclude them for failure to meet development commitments.

On August 7, 2012, BP supplemented the Eleventh Borealis PA POD to state that development of Borealis tracts 14, 15, and 16 would be integrated in development of the overall northwest Prudhoe Bay Unit. The supplement continued BP's vague position that the Borealis reservoir below these tracts was minor and that it would not be developed except in conjunction with the Orion PA.

C. Orion Participating Area History

On February 1, 2004, DNR approved the formation of the Orion PA comprising all or a portion of fourteen state leases for a total of approximately 18,842.375 acres. *See* Attachment 5. As of October 2003, two production wells on the V-Pad operated and produced from the central portion of what was to become the Orion PA as a PBU or Orion Tract Operation at a combined production rate of approximately 2,500 BOPD. The POD filed as part of the Orion Participating Area Application planned that the central and southern areas of the Orion PA would be developed in two phases using existing infrastructure on L, V, W, and Z-Pads. Phase I included expansion of the development at the V-Pad and drilling of at least one L-Pad tri-lateral producer. Phase II development anticipated the completion of wells in locations that could be drilled from existing gravel pads. There would be 10-20 producers and 20-40 injectors on the L, V, Z-Pads. An additional 2 producers and 4-8 injectors might be drilled from the W-Pad. Development of the northern area of Orion contemplated in Phase III would be developed from a proposed new "I-Pad." An estimated 10-20 producers and 20-40 injectors would be required, with production from the Orion Reservoir (Schrader Bluff Formation) tentatively scheduled to begin in 2006.

On May 21, 2004, BP submitted to the Division an Application for Enlargement of the PBU and Expansion of the Orion PA to the Division. On June 10, 2004, the Division requested additional information under 11 AAC 83.306. BP did not respond to the request, and the Division did not process the application.

On October 5, 2005, BP submitted the Second POD for the Orion PA. The POD stated that installation of the I-Pad was being evaluated. The pad would provide slots for the most northerly wells in the Orion PA.

By letter dated October 14, 2005, the Division notified BP that the proposed Second POD for the Orion PA did not comply with the requirements of 11 AAC 83.343 and was not accepted as complete. The plan did not include development plans for the northern area of the Orion PA or tracts 14, 15, and 16, and it did not describe any development activities to delineate the reservoir in that area or to bring those lands into production. The plan also failed to include long range plans to develop the northern tracts or put them into production and maintain it. The letter stated that failure to have an approved plan of development for the Orion PA could lead to unit default, PA contraction, or DNR action under Article 4.3 of the PBU Agreement.

On November 30, 2005, BP responded stating that plans to install the permanent I-Pad and to drill appraisal well I-100 from a temporary ice pad in the northwestern portion of the PA were

impacted by changes in the State's severance tax regarding the economic limit factors ("ELF"). BP stated that the ELF changes required it to reconsider the I-Pad and I-100 Well project economics. BP also supplemented the Second POD to provide for drilling of the I-100 well in 2006 and stated that construction of the I-Pad would occur in 2009 with production to begin in 2010.

On January 17, 2006, BP gave a technical presentation to the Division that supplemented the Second POD for the Orion PA. BP now stated that the timing of installation and development of the I-Pad was uncertain. BP suggested that the best case I-Pad scenario was construction in 2009 with production to begin in 2010. On February 27, 2006, the Division questioned the delay in I-Pad development but approved the Second POD for the period of January 1, 2006 through December 31, 2006. The approval letter went on to request that the Third POD for the Orion PA set out a firm commitment for the timing of I-Pad construction. The Division also requested that if BP proposed to delay I-Pad construction beyond 2007, that the Third POD include (1) an explanation of the justification for the delay, (2) the results of the I-100 drilling program and its impacts on I-Pad and PBU Western Region Development Plan (WRD), including down-hole logs, core, pressure data, oil geochemistry, seismic ties, and test results; (3) a description of what facilities will be constructed for WRD expansion and I-Pad development including an acceptable justification for combining I-Pad and WRD and delaying I-Pad standalone development past 2007; and (4) a firm schedule for WRD and I-Pad development with dates and a commitment to finalize I-Pad development.

On March 17, 2006, BP responded to the Division's February 27, 2006 approval letter stating that it did not plan to collect the requested data from the I-100 appraisal well so it would probably not be available. BP also stated that it had a different view on the status of Orion development, including the planned timing of the I-Pad, and thus BP was not "in accord" with the other Division requests. Those requests included a schedule for I-Pad construction. BP also made a general assertion that Article 5 of the Prudhoe Bay unit agreement would not allow DNR to take action for BP's non-compliance with DNR's requests, but BP did not elaborate.

On October 4, 2006, BP filed the Third POD for the Orion PA. I-Pad remained under evaluation. Gravel placement on the contemplated I-Pad location could not begin in summer 2006 because the I-100 ice pad constructed in winter 2006 had not sufficiently melted. The schedule for excavation was delayed so that it would begin in the winter of 2007-2008 to be followed by gravel placement. Gravel placement would require one year of in-place de-watering before drilling rigs could safely occupy the pad. Under this schedule, I-Pad development drilling would not commence prior to 2009. On December 29, 2006, the Division approved the Third POD for the Orion PA for the period January 1, to December 31, 2007 with a specification of the information that should be included in the Fourth POD for the Orion PA including well data and plans for delineation and development on the PA.

On October 4, 2007, BP filed the Fourth POD for the Orion PA. BP reported that it had completed Select Stage engineering in the second quarter of 2006 and began Define Stage engineering in October 2006 both for the I-Pad project. Define Engineering included geotechnical site investigation and the drilling of thirteen shallow boreholes at the proposed I-Pad location. This investigation determined that the original planned I-Pad location partially

coincided with a large subsurface ice lens that posed significant geotechnical, hydrology, and drilling issues. Work was underway to design a new I-Pad location, north of the ice lens. On December 13, 2007, the Division approved the Fourth POD for the period January 1 through December 31, 2008.

On August 5, 2008, BP submitted an updated Application to Expand the Orion PA and the PBU to include lease ADL 390067.

On September 30, 2008, BP filed the Fifth POD for the Orion PA which stated that I-Pad Define Engineering had been completed for a revised surface location to address the ice lens. The plan indicated that BP was focused on the capability of the processing facilities to handle viscous and sand-laden oil and completion technology for the N-sand. On December 15, 2008, the Division approved the Fifth POD for the period January 1, through December 31, 2009.

On February 18, 2009, the Division approved the expansion of the PBU on the condition that BP spud a well within ADL 390067 by September 1, 2009. If a well was not spud by that date, the unit expansion area automatically would contract out of the PBU. The portion of lease ADL 390067 not committed to the unit was severed and the lease segregated. Because there was insufficient data to establish whether the hydrocarbon potential of the Orion Reservoir within ADL 390067 was capable of producing or contributing to production in paying quantities, the proposed Orion PA expansion decision was deferred until all data from the proposed L-223i well was submitted to the Division for analysis.

In a May 18, 2009 letter, the Division extended the spud deadline and the automatic contraction deadline to October 15, 2009. BP spudded well L-223i in ADL 390067 on October 1, 2009 and the injection well was completed on October 27, 2009, according to the Alaska Oil and Gas Conservation Commission records.

On September 13, 2010, the Division approved the First Expansion of the Orion PA, effective October 1, 2010. The Orion PA expanded to encompass ADL 390067, an area of approximately 1,000 acres. *See* Attachment 6. The L-223i well is the only injection well within the expanded area and will support oil production from the hexa-lateral well L-203.

The Sixth and Seventh PODs for the Orion PA stated that the I-Pad project was deferred for an unstated period. The PODs focused instead on ongoing studies concerning technical issues such as the capability the GC-2 facility to handle viscous oil, matrix bypass events, and completion technology of the Orion N-Sand reservoir. The Division approved the Sixth and Seventh Orion PODs respectively on November 17, 2009 for the period January 1 through December 31, 2010 and on October 28, 2010 for the period January 1 through December 31, 2011.

On September 30, 2011, BP submitted 2012 PODs for the five PBU satellite PAs including the Eighth POD for the Orion PA. With regard to the Orion tracts 15 and 16 that were to be produced from the proposed I-Pad, the POD simply referred to work completed in 2008 and 2009 regarding production of viscous oil. The POD also referred to wells drilled in 2008 and 2010 from L and Z-Pads into the central portion of the PA and indicated that BP was continuing to work on reservoir characterization. All in all, BP's position with regard to the I-Pad had not

changed. No activities were proposed to install the I-Pad or to drill the proposed wells on tracts 15 and 16. The Eighth POD for the Orion PA continued to defer I-Pad installation and associated drilling indefinitely.

By letter dated October 10, 2011, the Division informed BP that it had reviewed the proposed Eighth or 2012 POD for the Orion PA and that the Division has also considered the information provided in the PBU Western Satellites Annual Overview and Reservoir Report. The Division found the 2012 Orion POD to be incomplete because it did not include a plan to install the I-Pad or to otherwise bring into production those portions of the reservoir that underlie Orion tracts 15 and 16. The POD simply continued to defer I-Pad construction for an indefinite period.

On December 13, 2011, BP responded stating that technical challenges and uncertainties regarding production of viscous oil resulted in an indefinite deferral of the I-Pad project. BP was continuing to study possible production from the reservoir underlying the proposed I-Pad location.

On December 30, 2011, February 29, March 30, and April 26, 2012, DNR expressly extended the expiration dates of the dates of the Seventh or 2011 POD for the Orion PA so that the parties could continue having discussions about the I-Pad project and to give BP an additional opportunity to propose a plan for development of the I-Pad. The Division met with BP on January 9, March 29, and May 17, 2012.

By letter dated May 24, 2012, the Division again notified BP that the 2012 Orion PA POD would need to propose a plan for the I-Pad project or the POD may not be acceptable. BP was also advised that if it failed to propose such a plan, the PA could be contracted to exclude the areas that would be produced by the I-Pad.

On August 7, 2012, BP supplemented its Eighth or 2012 POD for the Orion PA. The POD described the development plans for the central and southern portions of the PA. BP also referred to a number of challenges and continuing studies regarding production of viscous oil. These included the ability of the GC-2 processing facility to handle viscous oil and uncertainties about the N-Sand. BP also stated that it was studying the possibility of developing the area through the use of electronic lift pumps instead of the partial gas processing facility and gas lift BP had previously proposed to bring the area into production. If the pump system proved viable, it would eliminate the need for the gas lift and significantly reduce the scope of the proposed I-Pad project. BP committed during the 2012 plan period to upgrade the GC-2 facility to improve its ability to handle solids by a factor of 10, to do additional studies of the N-Sand reservoir to reduce uncertainties, and to study alternative well completion possibilities for the N-Sand, debottlenecking, and vegetation mapping for the I-Pad.

BP also stated that Orion PA production allocation is being performed according to the PBU Western Satellite Production Metering Plan which relies on well performance curves to determine production allocation.

III. REGULATIONS AND UNIT AGREEMENT PROVISIONS REGARDING PLANS OF DEVELOPMENT.

The PBU unit agreement (PBUA) included a general plan of development for the unit's initial participating area (IPA) including the oil rim and gas cap. PBUA Section 4.2. The plan was attached to the PBUA as exhibit E, and the areas covered by the plan are described in PBUA sections 5.1 (c) and (e) and exhibits D-1 and D-2 to the unit agreement. Section 4.2 of the PBU unit agreement also addressed additional plans of development for areas not included in the IPA, and set out a plan for these areas in exhibit E-1 to the unit agreement. Section 4.2 also required an additional plan of development for each new participating area that is approved by the director: "A plan of development and operation for each subsequently established Participating Area shall be submitted to the Director for approval as information upon which to base such plan is developed."

Both the generalized initial plan for the IPA in exhibit E and the generalized plan for additional areas not in the IPA in exhibit E-1 required the unit lessees to obtain approvals and permits as required by state law: "Unit Operators will continue to obtain approvals and permits for Unit Operations as required by State laws, regulations, and / or State Oil and Gas Lease stipulation (Attachment No. 1 hereto)." Exhibit E at E-7 and exhibit E-1 at E1-2. The PBU unit agreement also provides that it is subject to all state laws and orders: "This agreement shall be subject to all valid applicable federal and state laws, rules, regulations, and orders." Section 12.1.

The Borealis and Orion PAs are not within the area covered by the IPA plan in exhibit E. And they are not subject to the plan in exhibit E-1 for areas not included in the IPA because that plan expired in 1982: "The terms of this Plan shall cover the time period from the Effective Date of the Prudhoe Bay Unit Agreement through June 30, 1982." Exhibit E-1 at E1-2.

In 1977 when the PBU was formed, state statute authorized DNR to require that a unit operate under a plan approved by DNR. AS 38.05.180(m). The statute also authorized DNR to prescribe the plan. *Id.* The standard for approval was whether the plan was necessary and advisable in the public interest. *Id.* These provisions continue today in AS 38.05.180(p). DNR has also adopted regulations to assist the department in implementing the statute: 11 AAC 83.343 sets out the requirements for a unit plan of development and 11 AAC 83.303 sets forth the decision criteria for approval of a plan of development. It retains the public interest as the primary criteria.

11 AAC 83.343 provides:

> 11 AAC 83.343. Unit plan of development
>
> (a) A unit plan of development must be filed for approval as an exhibit to the unit agreement if a participating area is proposed for the unit area under 11 AAC 83.351, or when a reservoir has become sufficiently delineated so that a prudent operator would initiate development activities in that reservoir. All development operations must be conducted under an approved plan of development. A unit plan of development must contain sufficient information for the commissioner to determine whether the plan is

consistent with the provisions of 11 AAC 83.303. The plan must include a description of the proposed development activities based on data reasonably available at the time the plan is submitted for approval as well as plans for the exploration or delineation of any land in the unit not included in a participating area. The plan must include, to the extent available information exists

(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;

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

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

(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.

(b) The commissioner will approve the unit plan of development if it complies with the provisions of 11 AAC 83.303. If the proposed unit plan of development is disapproved, the commissioner will, in his discretion, propose modifications which, if accepted by the unit operator, would qualify the plan for approval.

(c) The unit plan of development must be updated and submitted to the commissioner for approval at least 90 days before the expiration date of the previously approved plan, as set out in that plan. The update must describe the extent to which the requirements of the previously approved plan were achieved; if actual operations deviated from or did not comply with the previously approved plan, an explanation of the deviation or noncompliance must be included in the update. The commissioner will approve the updated unit plan of development if it complies with the provisions of 11 AAC 83.303. If the proposed update of a unit plan of development is disapproved, the commissioner will, in his discretion, propose modifications which, if accepted by the unit operator, would qualify the plan for approval. Within 10 days after receipt of an updated unit plan of development, the commissioner will inform the unit operator as to whether the proposed unit plan of development is complete. After the commissioner has determined that an updated unit plan of development is complete as submitted, or as modified by the unit operator following the commissioner's suggestions, the commissioner will have an additional 60 days in which to approve or disapprove the plan; if no action is taken by the commissioner, the update of the unit plan of development is approved.

(d) The unit operator shall submit an annual report to the commissioner describing the operations conducted under the unit plan of development during the preceding year.

(e) The unit operator may, with the approval of the commissioner, amend an approved plan of development.

11 AAC 83.303 provides:

11 AAC 83.303. Criteria

(a) The commissioner will approve a proposed unit agreement for state oil and gas leases if he makes a written finding that the agreement is necessary or advisable to protect the public interest considering the provisions of AS 38.05.180 (p) and this section. The commissioner will approve a proposed unit agreement upon a written finding 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.

(b) In evaluating the above criteria, the commissioner 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 determines necessary or advisable to protect the public interest.

(c) The commissioner will consider the criteria in (a) and (b) of this section when evaluating each requested authorization or approval under 11 AAC 83.301 - 11 AAC 83.395, including

(1) an approval of a unit agreement;

(2) an extension or amendment of a unit agreement;

(3) a plan or amendment of a plan of exploration, development or operations;

(4) a participating area; or

(5) a proposed or revised production or cost allocation formula.

Current regulations 11 AAC 83.343 and 11 AAC 83.303 apply to this matter pursuant to the terms of the unit agreement. Section 12.1. These regulations are consistent with the unit agreement which required the unit operator to comply with all state laws, regulations, and orders and to obtain all necessary approvals and permits for unit operations. Sections 303 and 343 are also consistent with the statute in effect at the time of unit formation because they continue the public interest as the primary criteria for approval of a unit plan. AS 38.05.180(m).

IV. APPLICATION OF 11 AAC 83.303(b) DECISION FACTORS

11 AAC 83.303 sets forth the factors and criteria the Division is to consider in deciding whether to accept a POD. 11 AAC 83.303(c). The six factors set out in 11 AAC 83.303(b) are to be considered before applying the decision criteria in 11 AAC 83.303(a). They are (1) the environmental costs and benefits; (2) the geological and engineering characteristics of the potential hydrocarbon accumulation or reservoir; (3) prior exploration activities in the unit area; (4) 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).

A. 303(b)(1)-Environmental Costs and Benefits

Submittal of a plan or plans of development for a participating area is only one step in the process of obtaining permission to drill a well or wells or to develop known reservoirs within a unit area. The unit operator also must obtain permits from various agencies before constructing a pad, drilling a well or wells, or initiating development activities to produce known reservoirs. The operator must also obtain DNR's approval of a plan of operations.

State unitization regulations require the Commissioner's approval of a plan of operations before the unit operator performs any field operations. 11 AAC 83.346. A proposed plan of operations must describe the operating procedures designed to prevent or minimize adverse effects on natural resources.

Current Borealis and Orion reservoir development wells were drilled on existing PBU drill sites L, V and Z-Pads, and L and V-Pads, respectively. Produced fluids are commingled with fluids from other producing reservoirs in the PBU West End on the surface at the respective wells pads to maximize use of existing infrastructure, minimize environmental impacts, reduce costs, and maximize recovery.

DNR's 2004 approvals of the Borealis PA expansion and formation of the Orion PA contemplated the construction of the I-Pad and development of the northwestern portions of those reservoirs. The leases or portions thereof within the PAs contain stipulations designed to protect the environment, should development occur, and to address concerns regarding potential impact to fish and game, wildlife habitats, and subsistence. Lease conditions address issues such as construction of pipelines, seasonal restriction on operations, public access to, or use of, the leased lands, and avoidance of seismic hazards. The approval or disapproval of the Borealis and Orion PODs will neither change these protective measures, nor result in additional restrictions or limitations.

B. 303(b)(2) and (3)-Geological and Engineering Characteristics of the Potential Hydrocarbon Accumulation or Reservoir, and Prior Exploration Activities

BP submitted confidential data in support of its 2004 applications to expand the Borealis PA and to form the Orion PA. *See* Discussion of Decision Criteria, Section III.A.2, December 22, 2004 Findings and Decision approving the expansion of the Borealis Participating Area; Discussion of Decision Criteria, Section III.A.2, February 2, 2004 Findings and Decision approving the formation of the Orion Participating Area.

Since the original applications, the I-100 and I-100PB wells have been drilled in 2006 to delineate northern Borealis and Orion reservoir quality in the vicinity of the proposed I-Pad. The I-100PB was drilled as a high angle inverted lateral and plugged back before continued drilling of I-100, a Kuparuk (Borealis Reservoir) appraisal well. The I-100PB confirmed net pay in the Schrader Bluff (Orion Reservoir) Nb-Sand, OA-Sand, and Oba-Sand. The OBb-Sand and OBc-Sand were thinner than expected and the OBd-Sand was wet. In 2006, BP planned development of three of the six oil bearing sands. BP estimates that the N-Sand in the vicinity of the proposed I-Pad contains up to 30 percent of the N-Sand original oil-in-place (OOIP). *See* proposed Orion 2012 POD. According to AOGCC Conservation Order 505, OOIP for the N-Sand is estimated at 225 to 375 million stock tank barrels.

The I-100 well in the Borealis PA confirmed 13 feet of reservoir quality sand in the Kuparuk C1 interval and identified an oil-down-to depth of 6,634 feet true vertical depth subsea. That well is suspended.

C. 303(b)(4)-Applicant's Plans for Development of the Borealis and Orion Participating Areas

1. Borealis PA

Development of the Borealis Reservoir focused on phased drilling of production and injection wells from L, V, and Z-Pads. Initial drilling commenced July 2001 and production started in November 2001. Water injection began in June of 2002. Tertiary recovery utilizing IPA miscible injectant for water-alternating-gas injection (WAG) started in June 2004 as a pilot. The enhanced oil recovery pilot was completed and approved for field-wide miscible gas injection by the Alaska Oil and Gas Conservation Commission (AOGCC) on April 22, 2005. As of April 2012, 55 wells have been drilled and are currently completed in the Borealis Reservoir. The Z-Pad expansion project was complete in the third quarter of 2011. Most recent wells completed include producer Z-113, completed on September 15, 2011 and injector Z-116i, completed on December 27, 2011.

The proposed 2012 POD for the Borealis PA provides for:

- Drilling of an additional two wells from the Z-Pad
- Repairing the tubing in injection well V-119 to return it to service
- Brightwater treatment (injection in L-109 well) to improve areal conformance and waterflood recovery

But there are no plans to develop the northwestern portion of the Borealis PA or unit tracts 14, 15, and 16. BP has indefinitely deferred construction of the I-Pad and has made vague statements that delay development of these tracts within the Borealis reservoir until such time as BP decides to develop the Orion reservoir.

2. Orion PA

Development of the Orion Reservoir entailed phased drilling of 48 producers and injectors from the L, V, and Z-Pads. Initial drilling commenced in December 2001 with production startup in April 2002. Water injection began in December 2003. Tertiary recovery utilizing WAG started in October 2006. As of April 2012, 83 wells including lateral producers off a mother borehole and individual injectors (no laterals), have been drilled in the Orion Reservoir from the L and V-Pads. Of the 12 producers, 2 are hexa-laterals, 3 are penta-laterals, 3 are quadra-laterals and 4 are tri-lateral completions. Thirty-two wells are service injector wells.

BP proposes in the 2012 plan period to drill one new Orion injection well (V-229i) to replace a commingled injector. I-Pad Define Engineering has been completed for revised surface location. The I-Pad project remains deferred due to BP concerns about the capacity of GC-2 processing facility to handle viscous and sand-laden oil, and evaluation of N-sand production and completion technology.

In its August 7, 2012 supplement to the Eighth or 2012 Orion POD, BP made commitments to do significant amounts of work during the 2012 plan period to move tracts 15 and 16 of the Orion PA into production. These include upgrading the GC-2 facility to improve its ability to handle solids by a factor of 10, to do additional studies of the N-Sand reservoir to reduce uncertainties, and to study alternative well completion possibilities for the N-Sand, debottlenecking, and vegetation mapping for the I-Pad. The upgrade of the GC-2 facility appears to be a significant effort on BP's part to resolve issues associated with the sand-bearing nature of the Orion reservoir in the vicinity of tracts 15 and 16.

D. 303(b)(5)-The Economic Costs and Benefits to the State

DNR has an obligation to protect the public's interest in maximizing economic recovery from the State's oil and gas resources. AS 38.05.180(a)(1). Maximizing economic recovery of hydrocarbon ensures royalty and tax revenues, and increased employment opportunities over the long-term. Realization of these benefits requires development of state oil and gas properties.

The State will benefit from the current production operations in the Borealis and Orion PAs. But indefinite deferral of the I-Pad project and lack of a commitment to drill, develop, and bring in to production the northwestern portions of the Borealis and Orion PAs or unit tracts 14, 15, and 16 deprives the State of the benefits of leasing the properties by the depriving of the benefits of development and production such as royalties, taxes, and employment.

V. APPLICATION OF 11 AAC 83.303(a) DECISION CRITERIA

A. 303(a)-Public Interest

BP's continued deferral of the I-Pad and associated wells into the Borealis and Orion PAs is not in the public interest. BP has failed to follow through with representations it made that the I-Pad would be in place by 2006, and then 2010. Now BP simply says the I-Pad is deferred for an additional four to seven years.

BP's commitment, however, to increase the capability of the Orion production facilities to handle sand-laden oil of the N-Sands in the Northwestern portion of the Orion PA,

debottlenecking, and other work it has committed to do in the 2012 plan period is a significant step in bringing the northwestern portion of the Orion PA into production.

But BP has offered no justification for continued delay in developing the Borealis PA. Simply making vague statements that the Borealis PA may be developed at some uncertain time in the future if and when the Orion PA is developed is not an acceptable POD for the northwestern portion of the Borealis PA in the vicinity of tracts 14, 15, and 16. There is no justification for continuing to hold these tracts in the Borealis PA when BP has no plans to develop them.

B. 303(a)(1)-Conservation of all Natural Resources

The conservation of the natural resources of all or part of an oil or gas pool, field or like area means to maximize the efficient recovery of oil and gas and minimize the adverse impacts on the surface and other resources. Unit operations will allow for minimizing surface impacts of development and production activities and they are consistent with conservation of resources to the extent development occurs.

C. 303(a)(2)-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 of the oil and gas in place. Physical waste, among other things, includes the inefficient, excessive, or improper use, or unnecessary dissipation of, reservoir energy. Development of the northwestern portions of the Borealis and Orion PAs would utilize a new pad, I-Pad, with production, water injection, miscible gas injection and gas lift pipelines, power and telecommunications connecting into the existing PBU infrastructure, thus promote greater ultimate recovery and prevent economic waste.

D. 303(a)(3)-Protection of All Parties of Interest, Including the State

The people of Alaska have an interest in both the conservation of natural resources for human use and development of the State's oil and gas resources to maximize the economic and physical recovery of the resources. AS 38.05.180(a)(1); AS 44.37.020(a). It is further in the State's best interest to encourage assessment of oil and gas resources, to recognize the costs of exploring in varied geographic regions, and to minimize the adverse impact of exploration, development, production, and transportation activity. AS 38.05.180(a)(2). Unitization and PA formation is properly administered further these interests.

Unitization allows for the efficient development of multiple leases overlying a common reservoir. Unitization protects lessees by extending the primary terms of the leases in the unit but puts the State at risk that unitization will allow lessees to hold state oil and gas leases without developing them. Participating area formation protects lessees in part by making it more difficult to contract property within a PA from a unit. The requirement that a unit and a PA operate under a plan of development approved by the Division protects the State from lessees who would use unitization and PA formation as a method to warehouse state oil and gas leases by ensuring that leases included in a unit are being developed.

BP has not developed the northwestern portions of the Borealis and Orion PAs notwithstanding its representation that the I-Pad that would bring these areas into production by 2006 and then by 2010. Now BP estimates that I-Pad will not be operational for an additional four to seven years or by 2017 to 2020. There has been no timely development of the northwestern portions of the Borealis and Orion PAs. The Borealis POD offers the State no protection from utilizing unitization and PA formation for the purpose of simply holding state leases without developing them. Similarly, the Orion POD fails to set forth plans to bring the northwestern area into production but it offers some commitment to move the northwestern portion of that PA towards development particularly by increasing solids handling capability of the processing facilities.

Participating area formation also protects lessees by providing for the equitable allocation of production and costs among leases that contribute to production. But the northwestern portions of the Borealis and Orion PAs have not been developed and they do not contribute to production of hydrocarbons. Nevertheless BP has purportedly allocated production to tracts 14, 15, and 16 of the 2004 northern expansion area of the Borealis PA and tracts 15 and 16 of the Orion PA. Both areas cannot be produced without installation of the I-Pad and the drilling of associated wells and BP has thus far declined to do this work. It is not in the public interest to include non-producing leases in a unit or a PA.

VI. FINDINGS AND DECISION

The Division decisions of February 1, 2004 and December 1, 2004 approving the formation of the Orion PA and the expansion of the Borealis PA considered the further development and production of the reservoirs in association with the construction of the I-Pad planned for the first-half of 2006 that would provide drilling slots for the most northerly wells in both PAs. The Division has taken into account BP's description of costs and challenges associated with viscous and sand laden oil development; these issues are associated with the Orion PA and not the Borealis PA. Delay of the development of the Borealis reservoir for a minimum of an additional four to seven years while BP continues to work on Orion reservoir issues is not an appropriate Borealis POD. On the other hand, BP's commitment to significantly improve the capability of the production facilities to handle viscous and sand laden Orion oil in the 2012 plan period may well move the northwestern portion of that reservoir to production. I hereby make the following decisions and findings based on the filings and representations BP has made with respect to the Borealis and Orion PAs:

1. I disapprove the 11th or 2012 POD for the Borealis PA in respect to the northwestern unit tracts 14, 15, and 16.

2. I approve the 11th or 2012 POD for the remaining portions of the Borealis PA for the period October 1, 2012 through December 31, 2013. This approval is only for the general plan of development. Specific field operations may require additional approvals.

3. I approve the 8th or 2012 POD for the Orion PA in respect to the northwestern unit tracts 15 and 16 based on the work commitments BP has made for the 2012 plan period particularly its commitment to increase the production facilities capability to handle sand laden viscous oil by a factor of 10. The approval is for the period October 1, 2012

through December 31, 2013. This approval is only for the general plan of development. Specific field operations may require additional approvals.

4. I approve the 8th or 2012 POD for the remaining portion of the Orion PA for the period October 1, 2012 through December 31, 2013. This approval is only for the general plan of development. Specific field operations may require additional approvals.

5. Under 11 AAC 83.343(c), BP must submit the 2014 Borealis and Orion PODs to this office 90 days before the expiration of the 2012 PODs, that is, on or before October 2, 2013. The 2014 PODs must meet the requirements of 11 AAC 83.343 and fully inform the Division of the short and long term development plans, including a firm schedule for construction of the I-Pad and commitment to develop and to bring into production those portions of undeveloped Borealis and Orion reservoirs that underlie unit tracts 14, 15, and 16, and unit tracts 15 and 16, respectively.

6. BP is encouraged to consider contraction of tracts 14, 15, and 16 from the Borealis PA without prejudice to an application to expand the PA to include these tracts in the PA at such time as BP is committed to bring them into sustained unit production.

7. BP is encouraged to consider contraction of tracts 15 and 16 from the Orion PA without prejudice to an application to expand the PA to include these tracts in the PA at such time as BP is committed to bring them into sustained unit production.

8. BP must submit any data it has showing that tracts 14, 15, and 16 within the Borealis PA and tracts 15 and 16 within the Orion PA are actually in production or a statement that no data is available by December 31, 2012.

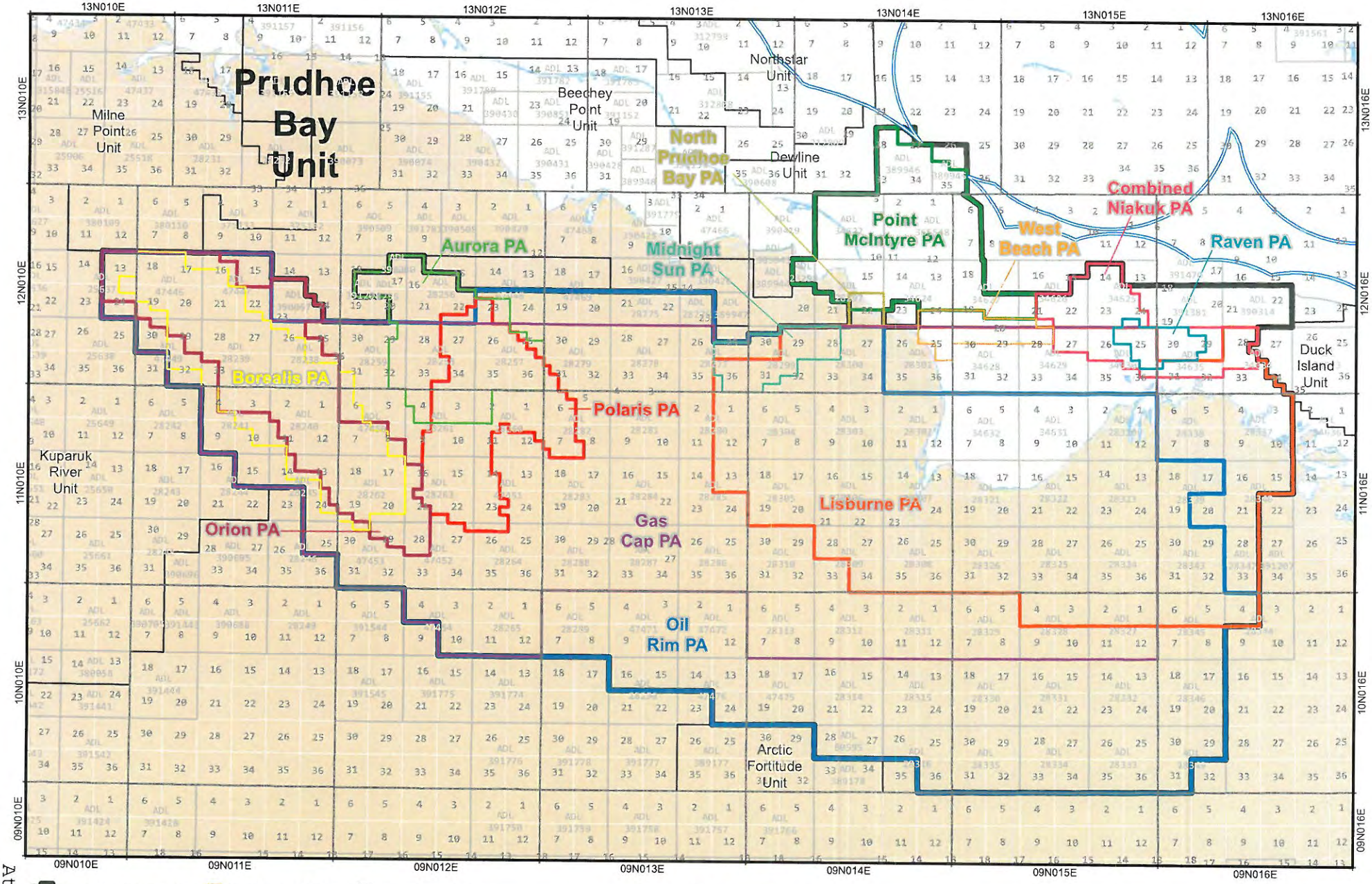
A person affected by this decision may appeal it, in accordance with 11 AAC 02. Any appeal must be received within 20 calendar days after the date of 'issuance" of this decision, as defined in 11 AAC 02.040(c) and (d), and may be mailed or delivered to Daniel S. Sullivan, Commissioner, DNR, 550 W. 7th Avenue, Suite 1400, Anchorage, Alaska 99501; faxed to (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.

W. C. Barron
Director
Division of Oil and Gas

9/28/12
Date

VII. ATTACHMENTS

1. Prudhoe Bay Unit Map
2. Borealis Participating Area Map [initial]
3. Location Map of the BPA and BPA Expansion Area [first expansion]
4. Location Map of the BPA and BPA Expansion Area [second expansion]
5. Lease Map of Orion Participating Area
6. Lease Map of Expanded OPA/PBU



Pruhoe Bay Unit Boundary
Aurora PA
Borealis PA
Combined Niakuk PA
Gas Cap PA
Lisburne PA
Midnight Sun PA
North Prudhoe Bay PA
Oil Rim PA
Orion PA
Point McIntyre PA
Polaris PA
Raven PA
West Beach PA
Surrounding Unit Boundary
Leased State Tracts
Section Grid
Township Grid
Alaska Seaward Boundary

Prudhoe Bay Unit

North Slope Region

0 1.25 2.5 5 Miles

This map was created, edited, and published by the State of Alaska, Department of Natural Resources (DNR), Division of Oil & Gas (DOG).

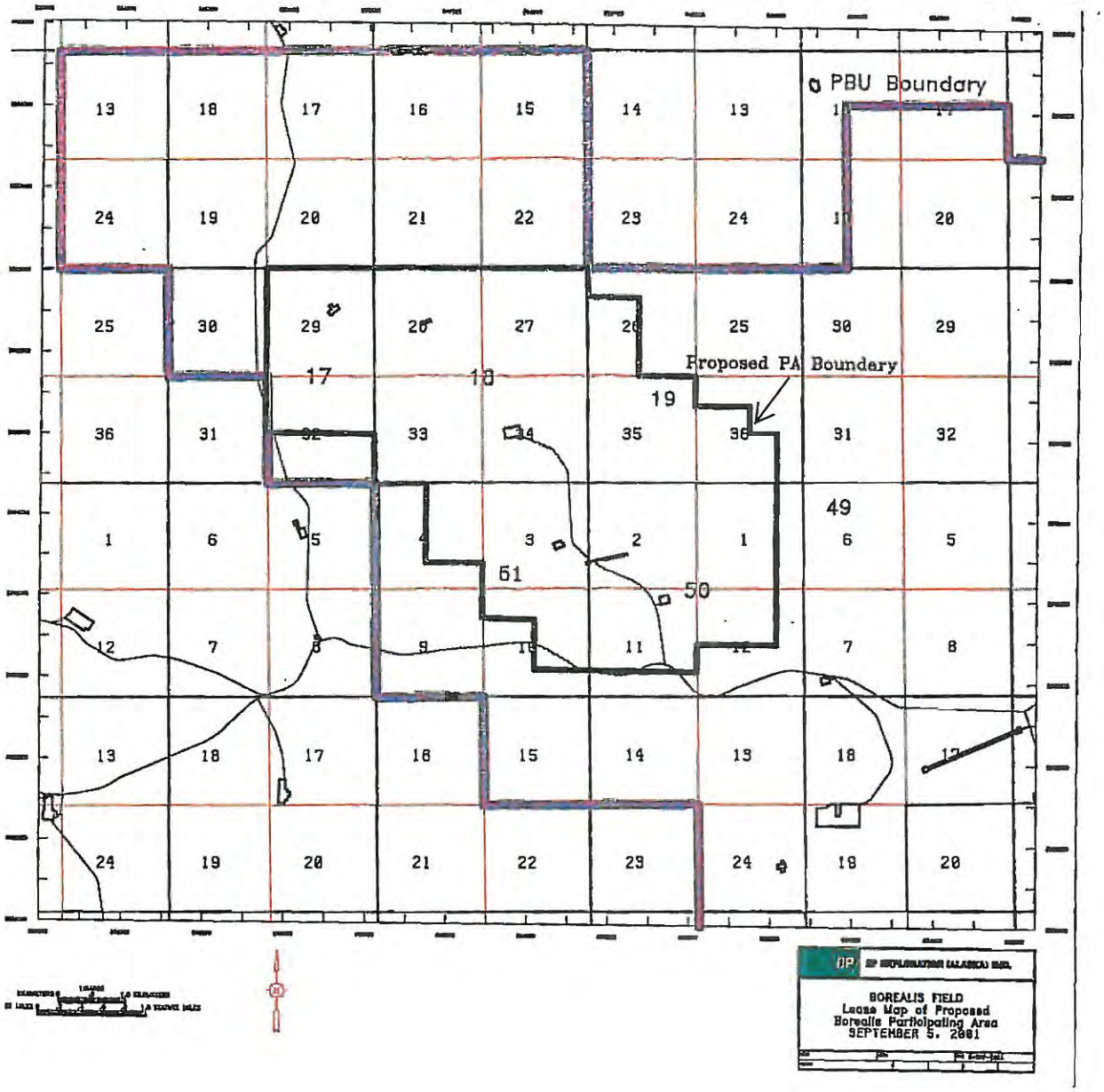
The information displayed is for graphic illustration only. The source documents remain the official record. Consult the DNR DOG Unit files, Lease files, and Land Administration System (LAS), or other sources comprising the official public record for additional information.

Discrepancies in boundary alignments are the result of merging multiple data sets from a number of different sources.

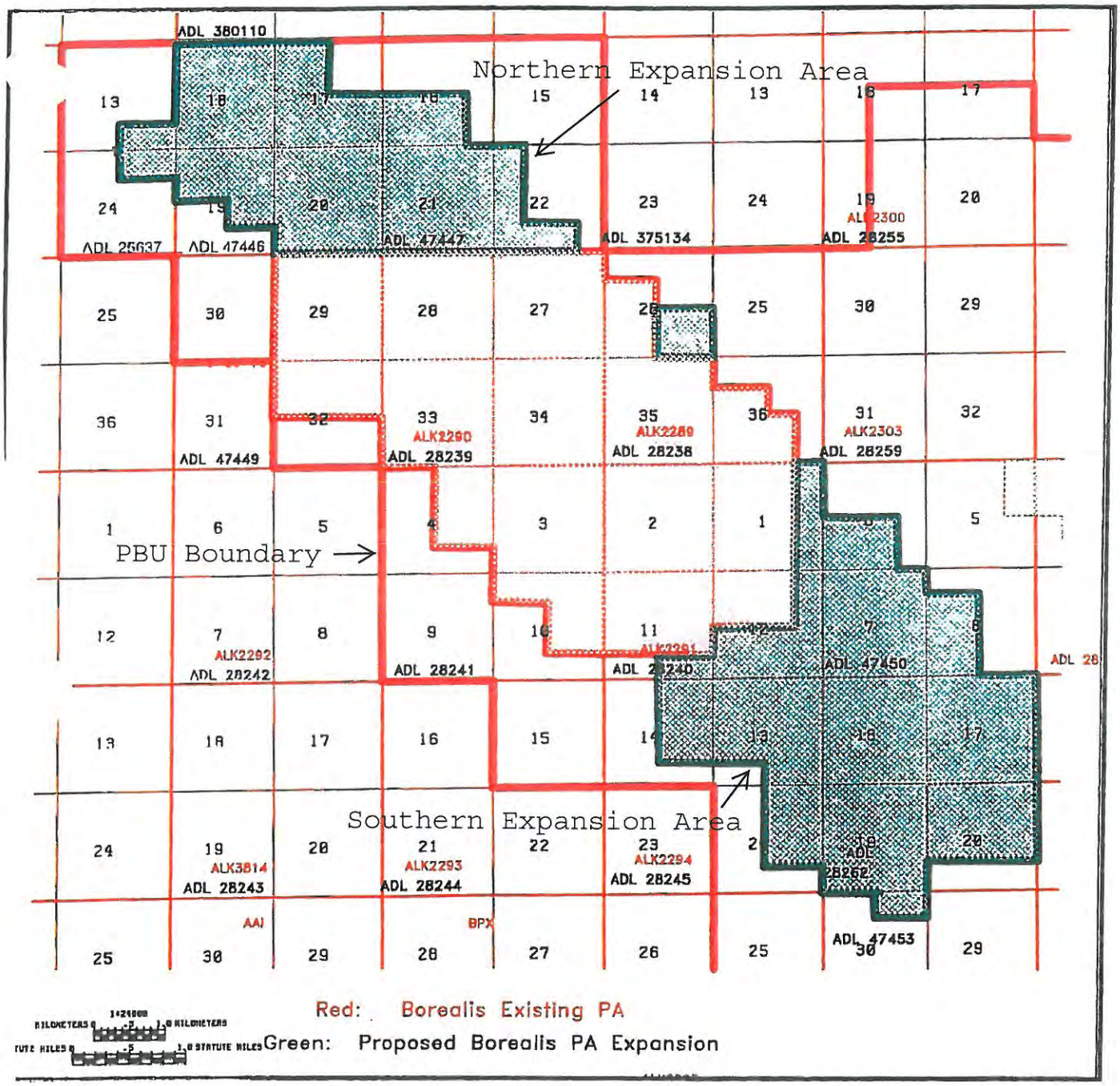
MAP PUBLISHED June 2012

Attachment 1

Borealis Participating Area (BPA)



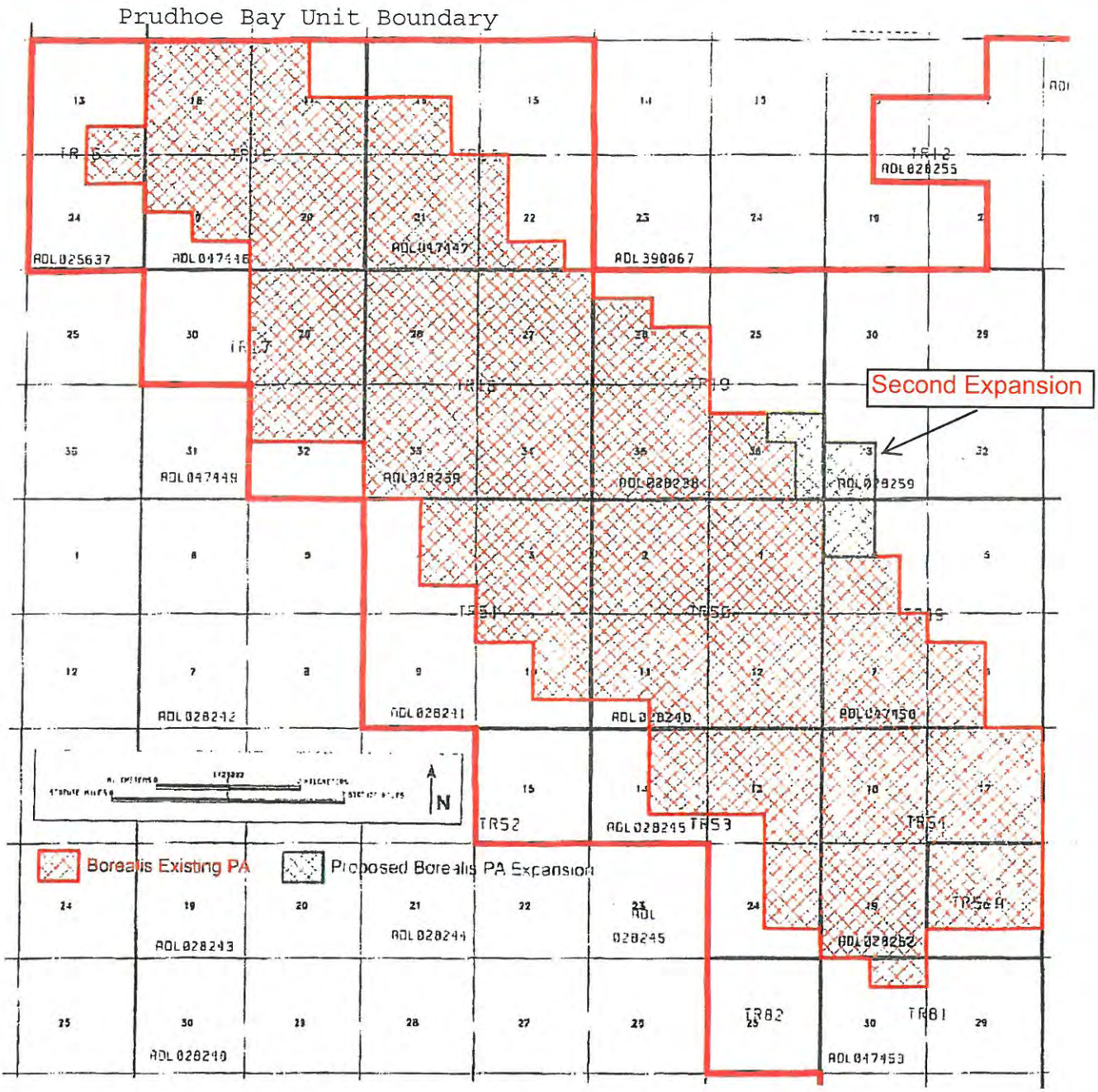
Attachment 2



Location Map of the BPA and BPA Expansion Area

First Borealis PA Expansion

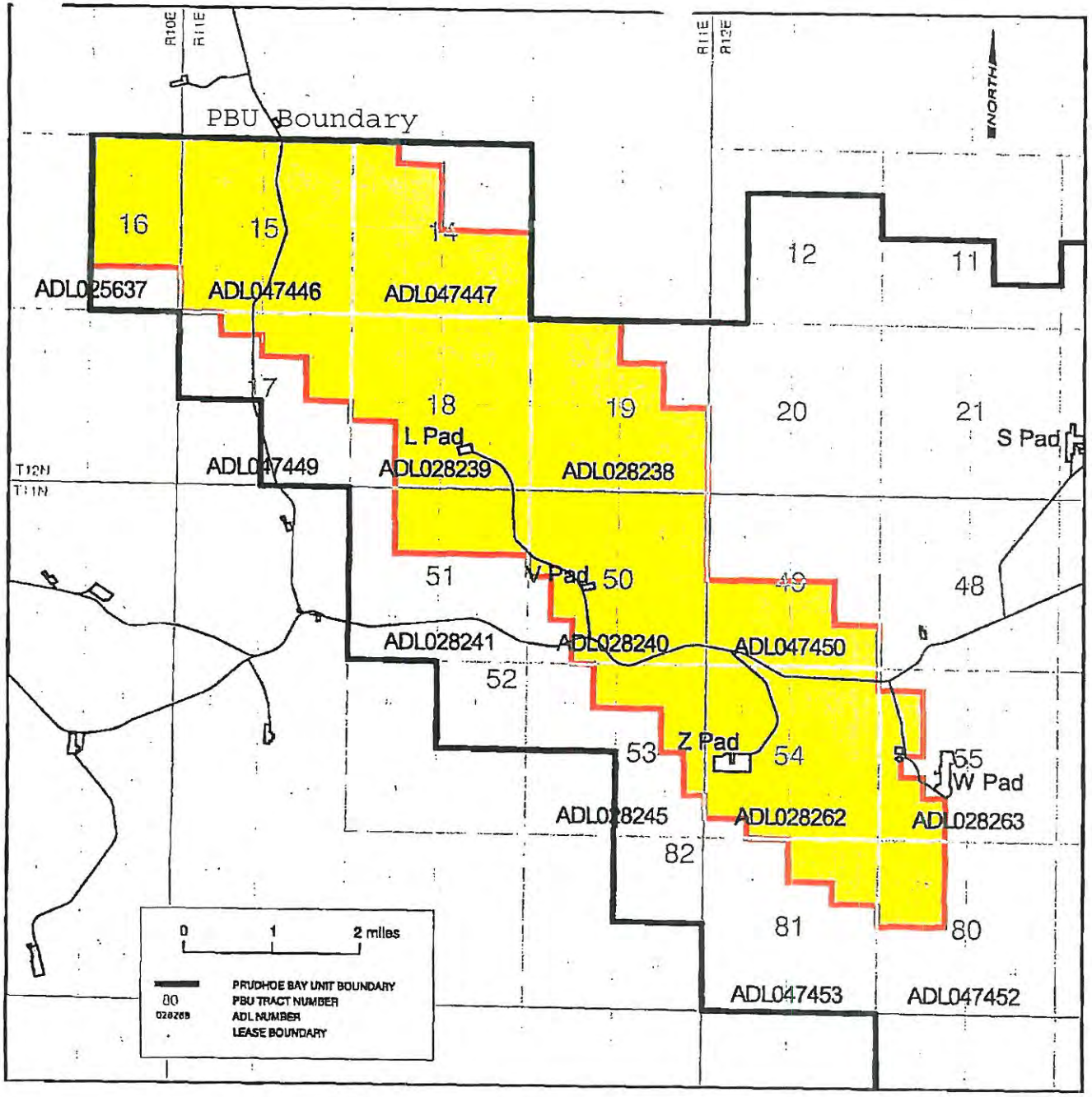
Attachment 3



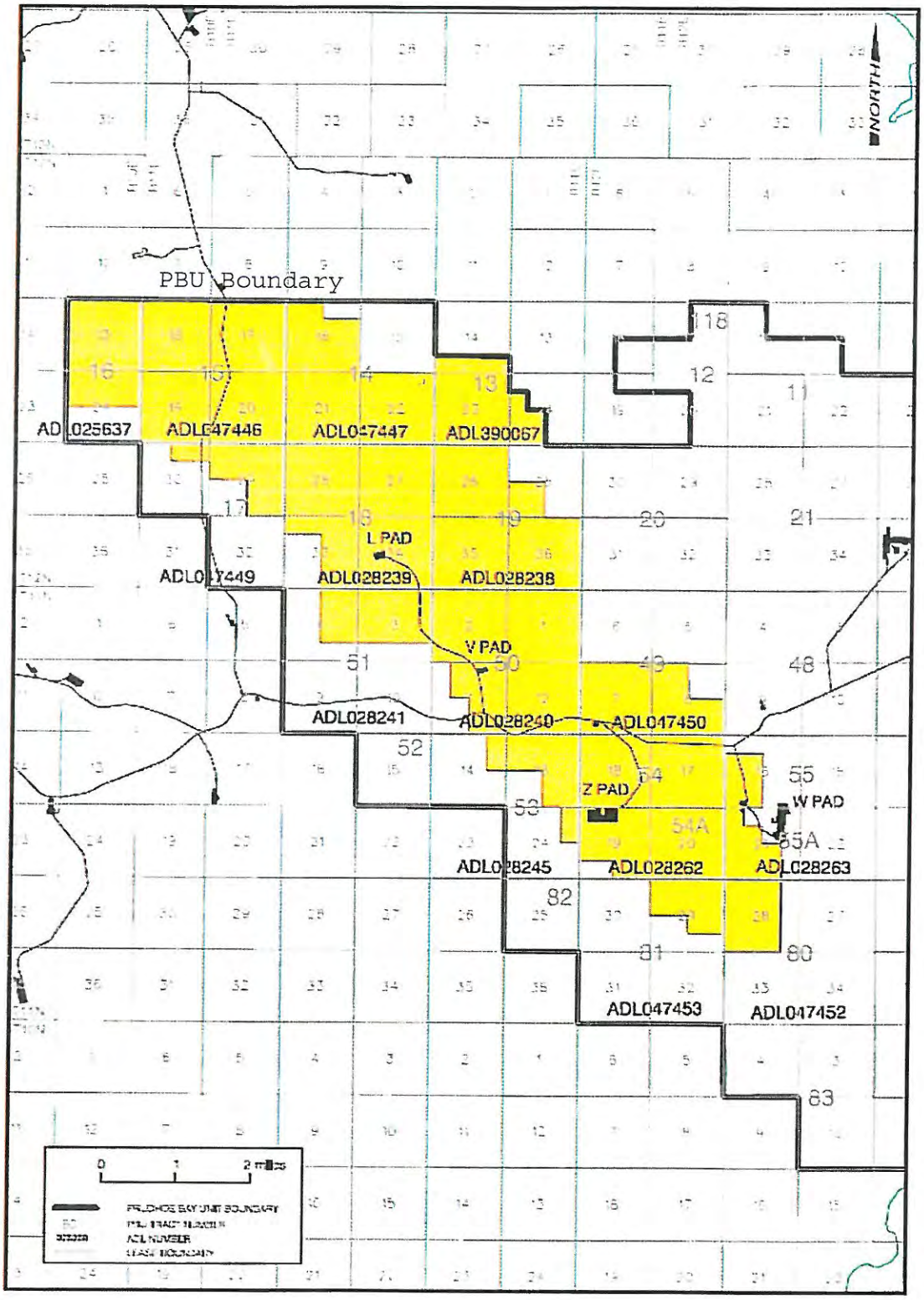
Location Map of the BPA and BPA Expansion Area

Second Borealis PA Expansion

Attachment 4



Lease Map of Proposed Orion Participating Area

Attachment 5

Lease Map of Expanded OPA/PBU