

PRUDHOE BAY UNIT

APPLICATION FOR
THE SIXTH EXPANSION OF THE UNIT AREA
AND
FORMATION OF THE AURORA PARTICIPATING AREA

FINDINGS AND DECISION OF THE COMMISSIONER
ALASKA DEPARTMENT OF NATURAL RESOURCES

DECEMBER 20, 2000

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SIXTH EXPANSION OF THE PRUDHOE BAY UNIT AREA AND FORMATION OF THE AURORA PARTICIPATING AREA

I. INTRODUCTION AND BACKGROUND

On August 1, 2000, BP Exploration (Alaska) Inc. (BP), as the Prudhoe Bay Unit operator, applied to expand the Prudhoe Bay Unit (PBU) area and form the Aurora Participating Area (APA) within the expanded unit area (the Application). The proposed APA includes portions of seven leases for a total of approximately 10,720 acres. The proposed PBU expansion area includes approximately 3,840 acres within two leases. With approval of the Application, the total unit area would include all or part of 111 leases and approximately 249,477 acres.

The proposed APA surrounds four wells drilled and completed in the Kuparuk geologic formation. ARCO Alaska, Inc. (ARCO) drilled an exploratory well (V-200) during the 1999/2000 drilling season. On June 27, 2000, the Division conditionally approved BP as the sole operator for the PBU. BP drilled three Kuparuk delineation wells, S-100, S-101, and S-102 in 2000. The geologic, well, and production data that BP submitted indicate that the Kuparuk hydrocarbon accumulation (Aurora reservoir) is capable of producing or contributing to the production of hydrocarbons in paying quantities. However, the data does not justify including the entire area proposed for the APA at this time.

The Department of Natural Resources, Division of Oil and Gas (the Division), approves an expansion of the PBU and formation of an Initial APA that is smaller than the area proposed in the Application. Subject to conditions discussed in this Findings and Decision, the Initial APA will be automatically expanded when and if BP drills Qualified Wells within defined expansion areas. The approved PBU expansion area includes approximately 2,480 acres within two leases. With this conditional approval of the sixth PBU expansion, the total unit area includes all or part of 111 leases and encompasses approximately 248,117 acres. The approved APA initially includes portions of five leases encompassing approximately 3,920 acres, with the potential to include a total of 8,240 acres by November 1, 2005. The effective date of the approved PBU expansion, formation of the Initial APA, and the Initial APA Tract Allocation Schedule is November 1, 2000.

II. APPLICATION FOR THE SIXTH EXPANSION OF THE PRUDHOE BAY UNIT AREA AND FORMATION OF THE AURORA PARTICIPATING AREA

On August 1, 2000, BP as the PBU operator submitted an application to simultaneously expand the PBU area and form the APA. The proposed 10,720 acre APA is comprised of portions of seven leases: ADL 28255, ADL 28256, ADL 28257, ADL 28258, ADL 28259, ADL 28261 and ADL 47448. BP and Phillips Alaska, Inc. (Phillips) each hold 50% working interest in 640 acres within ADL 28255 with BP, Phillips and Exxon Mobil Corporation (ExxonMobil) owning the remaining 1,280 acres in the lease in the following percentages 50%, 25% and 25%, respectively. The ownership of ADL 28256 is also split with 1600 acres owned by BP and Phillips, each with 50% interest, and the remaining 320 acres owned by BP, Phillips and ExxonMobil with 50%, 25% and 25% interest, respectively. The remaining five leases are within the PBU with

ownership aligned as follows: BP 26.66467%, Phillips 36.4927%, ExxonMobil 35.82283%, Mobil Alaska E & P Inc. (Mobil) 0.9998% and Forcenergy Inc. 0.02%. The state issued ADL 47448 following State Lease Sale Number 23 held on September 10, 1969, with an effective date of October 1, 1969. The other six leases were acquired in State Lease Sale Number 14 held on July 14, 1965. ADL 28257 and ADL 28261 had an effective date of September 1, 1965 while the remaining four leases were effective October 1, 1965. The state issued all of the leases on state lease form DL-1, revised October 1963, which provides for a ten-year primary term and 12.5 percent royalty to the state. ADL 28255 and ADL 28256 are currently outside of the PBU and the Application proposed adding approximately 3,840 acres from these two leases to the unit area. The PBU operators requested an effective date of October 1, 2000, for the PBU expansion and the APA.

BP's August 1, 2000 submittal included a ballot circulated to the PBU owners for expansion of the unit area, a map of the proposed APA and technical data comprised of maps, well logs and seismic data in support of the Application. The Division determined that the Application was incomplete and requested additional information on September 1, 2000. On September 8, 2000, BP submitted the Aurora Supplemental Provisions to the PBU Operating Agreement (Aurora Provisions) and the Aurora Facility Sharing Agreement (Aurora FSA) along with enlarged versions of the technical data previously submitted. The Plan of Development for the APA was included as Exhibit 151-D to the Aurora Provisions. On September 12, 2000, the Division received a tract participation schedule and tract map for the proposed APA.

The Division determined that the PBU expansion application was complete and published a notice in the *Arctic Sounder* on September 21, 2000 and in the *Anchorage Daily News* on September 17, 2000, as required by 11 AAC 83.311. Copies of the public notice were provided to interested parties in conformance with 11 AAC 83.311. These parties included the North Slope Borough; Arctic Slope Regional Corporation; the Alaska Department of Environmental Conservation; the Alaska Department of Fish and Game; the Alaska Department of Natural Resources, Division of Land; and the Alaska Oil and Gas Conservation Commission (AOGCC). The public notices invited interested parties and members of the public to submit comments by October 23, 2000. Mr. Richard Wagner and Dr. Robert O. Bolt (jointly referred to as "Wagner") submitted comments on the PBU expansion application on October 23, 2000. Wagner owns an overriding royalty interest in ADL 380066, an oil and gas lease located south of the PBU. Wagner requested that the Division modify the proposed PBU expansion area to include ADL 380066. The area appropriate for inclusion in the APA and PBU expansion will be discussed below.

The attachments to the Application described 3,840 acres in the proposed unit expansion area and 10,720 acres in the proposed APA. State regulation 11 AAC 83.351(a) states: "The participating area may include only the land reasonably known to be underlain by hydrocarbons and known or reasonably estimated through use of geological, geophysical, or engineering data to be capable of producing or contributing to production of hydrocarbons in paying quantities." The Division considered the three identified development wells insufficient to drain the entire area proposed for the APA. At an October 11, 2000 meeting with Division staff, the Aurora working interest owners supplemented the Aurora Plan of Development with a revised map with six proposed well locations and a drilling schedule to indicate the area that would contribute to production. The Division proposed conditioning its approval of the Application by forming a

smaller Initial APA with provisions for automatic expansions as additional Aurora wells are drilled, tied into the PBU Initial Participating Areas (IPA) production facilities and commence sustained production or sustained injection. In November 2000, the Aurora working interest owners agreed to the Division's conditions for approval of the Application.

On October 24, 2000, BP requested the Division's approval to begin production from the Aurora reservoir pending approval of the Application. On November 15, 2000, the Division approved the requested Lease/Tract Operations through December 31, 2000, or until the Division issues a decision approving the APA, whichever comes first. The Division's approval of the Lease/Tract Operations was subject to the working interest owners' consent to the Division's conditions for approval of the APA.

III. DISCUSSION OF DECISION CRITERIA AND FACTORS CONSIDERED

The Commissioner of the Department of Natural Resources (the Commissioner) reviews applications to expand units and form participating areas under AS 38.05.180(p) and 11 AAC 83.303 et. seq. By memorandum dated September 30, 1999, the Commissioner approved a revision of Department Order 003 and delegated this authority to the Director of the Division of Oil and Gas (the Director). The Director will approve the proposed sixth expansion of the PBU and formation of the APA if he finds that they will conserve the natural resources of an oil or gas reservoir and are necessary or advisable to protect the public interest.

A participating area may include only land reasonably known to be underlain by hydrocarbons and known or reasonably estimated through the use of geological, geophysical, or engineering data to be capable of producing or contributing to the production of hydrocarbons in paying quantities. 11 AAC 83.351(a).

“Paying quantities” means quantities sufficient to yield a return in excess of operating costs, even if drilling and equipment costs may never be repaid and the undertaking considered as a whole may ultimately result in a loss; quantities are insufficient to yield a return in excess of operating cost unless those quantities, not considering the costs of transportation and marketing, will produce sufficient revenue to induce a prudent operator to produce those quantities.

11 AAC 83.395(4). A participating area application must be evaluated under these standards, as well as those of 11 AAC 83.303.

(a) Decision Criteria

The Commissioner will approve a proposed unit expansion and formation of a participating area upon a written finding that they will: 1) promote the conservation of all natural resources; 2) promote the prevention of economic and physical waste; and 3) provide for the protection of all parties of interest, including the state. The following evaluates the proposed APA and sixth expansion of the PBU under these criteria.

1. Promote the Conservation of All Natural Resources

The unitization of oil and gas reservoirs and the formation of participating areas within unit areas to develop hydrocarbon-bearing reservoirs are well-accepted means of hydrocarbon conservation. Without unitization, the unregulated development of reservoirs tends to be a race for possession by competing operators. The results can be 1) overly dense drilling, especially along property lines; 2) rapid dissipation of reservoir pressure; and 3) irregular advancement of displacing fluids. These all contribute to the loss of ultimate recovery or economic waste. The proliferation of surface activity; duplication of production, gathering, and processing facilities; and haste to get oil to the surface also increase the likelihood of environmental damage. Requiring lessees to comply with conservation orders and field rules issued by the AOGCC would mitigate some of these impacts without an agreement to unitize operation. Unitization, however, provides a practical and efficient method for maximizing oil and gas recovery, and minimizes negative impacts on other resources.

Expansion of the PBU and formation of the APA will provide a comprehensive plan for developing the Aurora reservoir and exploration of reservoirs within the expanded PBU. The proposed plan of development for the APA provides for an efficient, integrated approach to development of the Aurora reservoir.

Expansion of the PBU will promote the conservation of both surface and subsurface resources through the unitized (rather than lease-by-lease) development. Unitization allows the unit operators to explore the area as if it were one lease. Expansion of the PBU and formation of a participating area over the Aurora reservoir will allow this area to be comprehensively and efficiently explored and developed. Adoption of the Aurora Provisions, the Aurora FSA and a plan of development governing production will help avoid unnecessary duplication of development efforts on and beneath the surface. Facilities can be located to maximize recovery and to minimize environmental impacts, without regard for individual lease ownership.

Producing hydrocarbon liquids from the Aurora reservoir through the existing PBU production and processing facilities will reduce the incremental environmental impact of the additional production. The planned Aurora reservoir development will use the existing PBU western operating area infrastructure of pipelines, roads, pads and processing facilities. Initial development of the Aurora reservoir is from PBU S-Pad using the existing production gathering lines from that pad to Gathering Center No. 2 (GC #2).

2. The Prevention of Economic and Physical Waste

Traditionally, under unitized operations, the assignment of undivided equity interests in the oil and gas reservoirs to each lease largely resolves the tension between lessees to compete for their share of production. Economic and physical waste, however, still could occur without an equitable cost sharing formula, as well as a well-designed and coordinated development plan. Consequently, unitization must equitably divide costs and production, and maximize physical and economic recovery from any reservoir. It must also treat the royalty owner fairly.

An equitable allocation of hydrocarbon shares among the working interest owners discourages hasty or unnecessary surface development. Similarly, an equitable cost-sharing agreement promotes efficient development of reservoirs and common surface facilities and encompasses rational operating strategies. Such an agreement further allows the working interest owners to decide well spacing requirements; scheduling; reinjection and reservoir management strategies; and the proper joint-use of surface facilities. Unitization prevents economic and physical waste by eliminating redundant expenditures for a given level of production, and adopting a unified reservoir management plan avoids the loss of ultimate recovery.

Unitized operations greatly improve development of reservoirs beneath leases that may have variable productivity. Marginally economic reserves, which otherwise would not be produced on a lease-by-lease basis, often can be produced through unitized operations in combination with more productive leases. Facility consolidation saves capital and promotes better reservoir management by all working interest owners. Pressure maintenance and secondary recovery procedures are much more predictable and attainable through joint, unitized efforts than would otherwise be possible. In combination, these factors allow less profitable areas of a reservoir to be developed and produced in the interest of all parties, including the state.

The lessees in the proposed unit expansion area and APA have signed the PBU Agreement, the Aurora Provisions, and the Aurora FSA agreeing to share the existing IPA facilities and the IPA infrastructure. Using the IPA infrastructure and facilities eliminates the need to construct stand-alone facilities to process the recoverable hydrocarbons from the Aurora reservoir. Facility consolidation will save capital and promote better reservoir management through pressure maintenance and enhanced recovery procedures. In combination, these factors allow the Aurora reservoir within the PBU to be developed and produced in the interest of all parties.

Expanding the PBU, forming a participating area over the Aurora reservoir, and allowing this area to access existing unit facilities and infrastructure prevents economic and physical waste.

3. Protection of All Parties

The proposed sixth expansion of the PBU and formation of the APA seek to protect the economic interests of the Aurora working interest owners as well as the royalty owner. Combining interests and operating under the terms of the PBU Agreement, the Aurora Provisions, and the Aurora FSA assures each individual working interest owner a reasonable allocation of costs and revenues commensurate with the value of its lease(s).

Because hydrocarbon recovery will be maximized and additional production-based revenue will be derived from the Aurora reservoir, the state's economic interest is promoted. Diligent development and exploration under a single approved unit plan without the complications of competing leasehold interests is certainly in the state's interest. It promotes efficient evaluation and development of the state's resources, yet minimizes impacts to the area's cultural, biological, and environmental resources.

On October 23, 2000, Wagner requested that the Division modify the proposed PBU expansion area to include ADL 380066, a lease in which they own an overriding royalty interest. As

discussed in more detail later in this Findings and Decision, the Division reviewed the technical data submitted in support of the Application and there is no indication that production from the APA will drain hydrocarbons from ADL 380066. All parties with a known interest in the Aurora reservoir are protected by formation of the APA.

(b) Factors Considered

The Division considered the following factors when reviewing the above criteria:

1. The Environmental Costs and Benefits of Unitized Exploration and Development

State regulation 11 AAC 83.303(b)(1) requires the Commissioner to assess the environmental costs and benefits of the proposed PBU expansion and APA formation. The Division's approval of an initial plan of development is only one step in the process of obtaining permission to drill a well or wells or develop the known reservoirs within the unit area. The unit operator also must obtain permits from various agencies before drilling a well or wells or initiating development activities to produce known reservoirs within the unit area. And the operator must obtain the Division'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. When reviewing a proposed plan of operations, the Division will consider the unit operator's ability to compensate the surface owner for damage sustained to the surface estate and the plans for rehabilitation of the unit area.

On October 19, 1999, BP, as operator of the Western Operating Area of the PBU, requested the Division's approval of a Unit Plan of Operations for the Aurora reservoir. BP planned to expand S-Pad to accommodate 14 Aurora reservoir development wells. On December 28, 1999, the Division of Governmental Coordination (DGC) within the Governor's office (DGC) issued a final determination that the proposed expansion of S-Pad was consistent with the Alaska Coastal Management Program. The Division conditionally approved the Unit Plan of Operations for the Aurora development on December 29, 1999. BP applied for and received the permits and authorizations necessary to drill the S-100, S-101, and S-102 wells.

When the lessees propose further exploration and development of the expansion area, the Division will ensure that an updated unit plan of operations complies with the lease stipulations and lessee advisories developed for the most recent North Slope Areawide lease sale. The Division develops lease stipulations through the lease sale process to mitigate the potential environmental impacts from oil and gas activity. These mitigation measures address such issues as the protection of primary waterfowl areas, site restoration, construction of pipelines, seasonal restrictions on operations, public access to, or use of, the leased lands, and avoidance of seismic hazards. Additionally, lease operations may be subject to a coastal zone consistency determination and must

comply with the terms of both the state and North Slope Borough coastal zone management plans as appropriate for the proposed activity.

Ongoing mitigation measures such as seasonal restrictions on specific activities in certain areas can reduce the impact on bird, fish and mammal populations. Designating primary waterfowl areas is one method of protecting the bird habitat. Regulating waste disposal is another way to limit environmental impacts. The Division also requires consolidation of facilities to minimize surface disturbances. With these mitigating measures, the anticipated exploration and development related activity is not likely to significantly impact bird, fish, and mammal populations.

Area residents use the proposed expansion area for subsistence hunting and fishing. Expanding the PBU to including acreage within ADL 28255 and ADL 28256 will not result in additional restrictions or limitations on access to lands or public and navigable waters used for subsistence purposes. Oil and gas activity may impact some wildlife habitat and some subsistence activity. The environmental impact will depend on the level of development activity, the effectiveness of mitigation measures, and the availability of alternative habitat and subsistence areas. In any case, the anticipated activity under the expanded PBU will impact habitat and subsistence activity less than if the lessees developed the leases individually. Unitized exploration, development and production will minimize surface impact.

2. The Geological and Engineering Characteristics of the Proposed Prudhoe Bay Unit Expansion Area and Aurora Participating Area

BP, PBU operator, is applying to form the APA to produce hydrocarbons from the Kuparuk formation in the Aurora reservoir. BP provided adequate maps, cross sections, seismic lines, and well data to support the Application.

The Aurora reservoir contains both proven and potential Kuparuk production. It is located in the northwestern area of the PBU, near other proven Kuparuk accumulations. The Kuparuk field in the Kuparuk River Unit lies to the west of the Aurora reservoir; the Kuparuk River formation in the Cascade area of the Milne Point Unit lies to the northwest; and the Gwydyr Bay Area lies northeast of the Aurora reservoir.

The Aurora reservoir is an extension of the major structural and stratigraphic features that are present in the producing Kuparuk River formation in the Milne Point Unit to the northwest. Both the Milne Point Kuparuk field and the Aurora reservoir are cut by two major regional bisecting fault systems. One fault system strikes northwest-to-southeast; the other fault system trends north-northeast to south-southwest. The fault throw varies throughout the field. There are major faults with throws ranging from 150 to 350 feet and numerous smaller faults with throws between 10 and 100 feet. These faults break the Aurora reservoir into isolated fault blocks with varying oil-water contacts.

The Kuparuk River formation is subdivided into four major informal members that are designated with letters A through D. The 'A' member is the oldest and the 'D' member is the youngest. Each member is further subdivided into sub-members that are designated with numbers, such as C-1 and B-7 (with one being the oldest sub unit). The 'C' and 'B' members

are separated by a major unconformity, the Lower Cretaceous Unconformity (LCU). The Kuparuk field produces oil out of the Kuparuk 'A' and 'C' sands in the Kuparuk River Unit while the Kuparuk 'A,' 'B,' and 'C' sandstones produce oil from the Kuparuk field in the Milne Point Unit.

Based on log and seismic evidence, the Division expects that the Kuparuk 'C' sandstone in the Aurora reservoir will be similar to the Kuparuk 'C' sandstone reservoir in the Milne Point Unit. The most productive Kuparuk 'C' sandstone areas tend to be associated with thicker sand intervals deposited in paleo-topographic depressions on down-thrown fault blocks. Each fault block in the Aurora reservoir will likely contain a different oil-water contact. There is upside potential for some hydrocarbon-bearing Kuparuk 'A' sandstone to underlie the Kuparuk 'C' sandstone pay in the structurally higher areas of the Aurora reservoir.

3. Prior Exploration Activities

Approximately 30 wells were drilled from S-Pad into the southeastern area of the proposed APA as development wells to produce the Ivishak formation within the PBU. Only three of those wells, S-03, S-14, and S-16, were logged through the Kuparuk interval.

In addition, three exploration wells, the Mobil-Phillips North Kuparuk State Well # 26-12-12 and ARCO-Exxon Beechey Point No. 1 and No. 2 wells, were drilled within the proposed APA area during 1969-1970. The primary objective of these wells was also the Sadlerochit (Ivishak) formation, however, while drilling down to the Ivishak, all three wells encountered evidence of hydrocarbons in the Kuparuk 'C' Sandstone.

Twenty feet of Kuparuk formation was cored in the Mobil-Phillips North Kuparuk #26-12-12 well. The sandstone is described as quartzose with minor glauconite and mica with good oil shows. The operator attempted a drill stem test (DST) in this interval, but the test failed. Since there were no successful well tests in the Kuparuk, the evidence for hydrocarbons is based on the well logs and core shows. The resistivity logs display evidence of hydrocarbon-bearing Kuparuk 'C' sandstones between approximately 6,790' to 6,860' true vertical depth (tvd) (-6,743' to -6,813' true vertical depth sub sea (tvdss)). A potential oil/water contact is present around -6,800' tvdss.

The ARCO-Exxon Beechey Point No.1 well tested a 25' section of Kuparuk 'C' sandstone from 6,690' to 6,715' tvd (-6,647' to -6,672' tvdss). A 5 1/2 hour DST recovered 17.8 barrels of 52 degree API oil and produced condensate at a rate of 2.5 thousand cubic feet of gas per day (MMCFGPD).

The ARCO-Exxon Beechey Point No. 2 well, directionally drilled from a kick-off point in the Beechey No. 1 wellbore, encountered the top of the Kuparuk 'C' sandstone interval around 6,809' tvdss. Although the operator attempted to conduct a DST in the Kuparuk interval, it failed and no hydrocarbons were tested or produced. The operator plugged and abandoned the ARCO-Exxon Beechey Point No. 2 well.

No further exploration wells were drilled within the proposed APA until 1999, when ARCO drilled the V-200 well as a PBU satellite prospect with Shrader Bluff and Kuparuk formation

objectives. On December 21, 1998, ARCO requested approval of a Tract Operation to drill the Kuparuk V-200 well as an expendable well from an ice pad located on PBU Tract 58. On December 28, 1998, the Division conditionally approved ARCO's plan to drill the V-200 well and perform well tests until Jun 15, 1999, or the conclusion of Tundra Travel, whichever was later. ARCO spudded the V-200 well on January 22, 1999, from an ice pad west of the PBU S-Pad. It reached a total depth of 7,476 feet (measured depth). ARCO did not test the Schrader Bluff formation because open-hole logs through the interval indicated that the Schrader Bluff sands were wet. ARCO perforated 58 feet in the V-200 wellbore and tested the Kuparuk interval between February 24, 1999 and March 7, 1999. ARCO's August 6, 1999 status report stated "the well flowed at a stabilized rate of 1915 BOPD of 29.6 API gravity oil, 0 BWPD, and 1.375 MMSCFD, indicating the well is capable of producing hydrocarbons in paying quantities." ARCO named the Kuparuk accumulation the Aurora field and estimated that it held 20 to 35 million barrels of recoverable oil. ARCO permanently plugged and abandoned the V-200 well on April 1, 1999. The working interest owners were encouraged by the V-200 well test results and proceeded to evaluate and develop the Kuparuk formation.

During the past year BP drilled three Aurora reservoir development wells from S-Pad, S-100, S-101, and S-102 (Aurora Wells). BP spudded the first two Aurora Wells, S-100 and S-101, located on PBU Tract 21, in July and August 2000, respectively. In October 2000, BP spudded the third Aurora Well, S-102, which was located outside of the current PBU on ADL 28256. Production from the Aurora Wells began in November 2000 under the Division's November 15, 2000, conditional approval of Lease/Tract Operations. Although the Division has not yet seen a full suite of logs from the Aurora Wells, it appears that results are encouraging enough for BP to apply to form a participating area and initiate sustained production from the Aurora reservoir.

4. The Applicant's Plan for Development of the Aurora Participating Area

The PBU operator, BP, submitted an initial plan of development for the Aurora reservoir on September 8, 2000. BP supplemented the initial plan of development on October 11, 2000, with a map showing the locations of three completed wells and three proposed wells and a drilling schedule. BP plans to drill between 15 and 20 production and injection wells within the next three years. All wells will be drilled from S-Pad. Production from the Aurora reservoir will be commingled with production from other PBU reservoirs on S-Pad and processed through the IPA production facilities at GC #2. Gas from the Aurora reservoir that is not used in operations as fuel, flared or lost will be injected into the Permo Triassic reservoir in the IPA.

As the APA operator, BP plans to initiate a waterflood program by the first quarter of 2001. A midfield waterflood configuration is planned with the conversion of the S-101 well to water injection service. Source water for the injection program will be obtained from the IPA.

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

As discussed in section III (a) 3 above, increased production and revenues, in and of themselves and without consideration of other relevant factors, may not always be in the state's best interest.

5.1. Facility Sharing, Production Allocation and Metering

BP represented to the Division that development of the Aurora reservoir is possible because it will share the existing IPA facilities and infrastructure. Under the proposed plan of development, APA production will be commingled with production from other PBU reservoirs in the shared fluid separation and processing facilities at GC #2. Instead of individually metering the volume of oil, gas and water produced from each reservoir, a commingled hydrocarbon stream will pass through a custody transfer meter at Pump Station #1 (PS #1) on the Trans Alaska Pipeline System.

On November 15, 2000, the Division approved a methodology for allocating production from the Aurora Wells through the IPA facilities (Interim Metering Plan) for the Lease/Tract Operations. The Interim Metering Plan requires a minimum of two well tests per month through the S-Pad test separator for each Aurora Well and daily production based on straight-line interpolations between valid well tests. The total volume of production from the Aurora reservoir is designated an allocation factor of 1.0. The portion of the commingled production stream measured at PS #1 that is allocated to the Aurora reservoir must equal the volume determined under the Interim Metering Plan. The Application proposed, and the Division approves, the continued application of the Interim Metering Plan to allocate production from the APA through the IPA facilities.

The PBU working interest owners are considering several alternative long-term metering methodologies to properly allocate production to each reservoir in the PBU. Division staff will work with BP and the working interest owners to determine a long-term metering plan that is acceptable to all parties. The Interim Metering Plan will remain in effect for the APA until the Division approves a long-term production measurement plan.

5.2. Gas Disposition

Among themselves and in their agreements the Aurora working interest owners agreed to consider all Aurora reservoir gas delivered into IPA production facilities as having been used in operations as fuel, flared or lost. However, we recognize that there may be more gas produced beyond that used as fuel, flared or lost. In the proposed plan of development for the APA, the Aurora working interest owners state that Aurora reservoir gas not used in operations, as fuel, flared or lost, will be injected into the IPA Permo-Triassic reservoir. The Division acknowledges that for royalty reporting purposes, the natural gas liquids (NGLs) removed from APA produced gas will be accounted for and reported as indigenous IPA fluids. Any residue gas from the APA injected into the IPA Permo-Triassic reservoir will be treated as indigenous IPA natural gas for royalty reporting purposes. The Division will allow the Aurora working interest owners to give the APA gas and NGLs to the IPA and the IPA working interest owners will be responsible for royalty payments when the gas is ultimately sold. The Division will allow this arrangement for the APA because it would be burdensome for the Division and the Aurora working interest owners to track and report the relatively small amount of gas produced from the Aurora reservoir. The Division will consider whether to require a gas disposition report for other participating areas on a case-by-case basis.

5.3. Tract Allocation Schedule

BP submitted a tract allocation schedule that prescribes how the Aurora working interest owners plan to allocate the production and costs between the leases in the APA as required by 11 AAC

83.371. The proposed allocation schedule distributes working interest equity among the lease tracts based on the working interest owners' initial assessment of original oil in place. However, the tract allocation schedule BP submitted for the proposed APA is not appropriate for the Initial APA approved by this Findings and Decision because it allocates production to areas not approved for inclusion in the Initial APA. BP must submit a revised tract allocation schedule for the Initial APA described below. All of the leases within the approved APA reserve a 12.5% royalty to the state and the state is the sole royalty owner of the leases in the APA.

5.4. Field Costs

Since the APA approved by this Findings and Decision is within the original PBU boundary, the 1980 Prudhoe Bay Royalty Settlement Agreement governs the field cost allowance for the state's royalty share of production from the APA.

5.5. Other Relevant Factors

The technical data submitted in support of the application indicates that most of the area within the proposed APA is reasonably known to be underlain by hydrocarbons, but due to extensive faulting and the limited number of proposed wells, it may not be reasonably estimated that the entire area will contribute to production. Because the Aurora reservoir is broken-up into separate fault blocks, most likely with separate oil-water contacts, the Division is approving a smaller Initial APA than proposed in the Application. The Initial APA is the area that is reasonably estimated to contribute to production from the six wells identified in the Aurora Plan of Development. The Initial APA conforms to 80-acre spacing around the wells that are now or soon will be producing or contributing to the production of hydrocarbons from the Kuparuk formation.

Based on the drilling and production data from the Kuparuk formation in the Milne Point Unit, we anticipate that the Kuparuk formation in the APA will vary in thickness and have different oil-water contacts within individual fault blocks. Therefore, consistent with the practice in the Milne Point Unit, the APA will expand as BP drills additional wells in the individual fault blocks, and those wells are tied into the IPA facilities as injectors or producers. Four Expansion Areas, defined by major faults within the Aurora reservoir, are described in Section IV, paragraph #17 below. As qualified wells are drilled in each Expansion Area and tied into the IPA facilities, the APA will automatically expand to include that Expansion Area. The Aurora working interest owners consented to the Division conditioning its approval of a smaller Initial APA and providing for automatic expansion of the APA prior to November 15, 2000, when the Division approved the Lease/Tract Operations.

Allowing automatic expansions of the APA allows for efficient development of the reservoir and reduces the administrative burden of processing numerous expansion applications. The conditions for automatic expansion encourage exploration and development of the entire Aurora reservoir, rather than concentrated development in the core area. It is reasonable to allow automatic expansions of the APA, with the conditions listed below, because the majority of the area is underlain and held by production from the IPA. The Division would not allow similar expansions in unexplored areas or to save leases from expiration without a definite commitment to drill. The operator is required to drill qualified wells in the expanded PBU area prior to he

expiration dates of the leases. If the PBU expansion area is not contributing to production on the date the leases are due to expire, the acreage will contract out of the PBU.

On October 23, 2000, Wagner requested that the Division modify the proposed PBU expansion area to include ADL 380066, a lease in which they own an overriding royalty interest. Wagner claims "DNR has previously certified the ARCO #1 Hemi Springs well, located on this referenced lease, as capable of producing hydrocarbons in commercially paying quantities." However, according to Division records, the referenced well is not located on ADL 380066. On June 5, 1984, pursuant to 11 AAC 83.361, the Division certified the Hemi Springs State #1 well, located on ADL 28249, as capable of production in paying quantities. The productive zone in the Hemi Springs State #1 well is located over 1000 feet northwest of ADL 380066 and nearly eight miles south of the APA. The data submitted by BP in support of the Application does not indicate that the Aurora reservoir extends over eight miles south onto Wagner's lease. And Wagner did not submit any technical data to support his claim that ADL 380066 should be included in this expansion of the PBU boundary. Given the faulted structure within the Aurora reservoir, and the fact that the Division determined that the available data does not justify including the entire area proposed by BP, the data also does not support an expansion of the APA to include Wagner's lease, ADL 380066. In a letter dated November 27, 2000, the Division invited Wagner to submit an application for a southern expansion of the PBU to include acreage within ADL 380066.

IV. FINDINGS AND DECISION

Considering the facts discussed in this document and the administrative record, I hereby make findings and impose conditions as follows:

1. The expansion of the PBU and the formation of the APA are necessary and advisable to protect the public interest. AS 38.05.180(p) and 11 AAC 83.303.
2. The available geologic data, production well data and development plans justify an expansion of the PBU. Under the regulations governing formation and operation of oil and gas units (11 AAC 83.301 - 11 AAC 83.395) and the terms and conditions under which these lands were leased from the State of Alaska, the following lands are added to and included in the PBU area:

PBU Expansion Area

Tract 11, ADL 28256:

T. 12N R. 12E UM

Section 21: ALL

Section 22: W1/2NW1/4, S1/2

Containing approximately 1,040 acres, more or less.

Tract 12, ADL 28255

T. 12N R. 12E UM

Section 17: S1/2

Section 18: SE1/4
Section 19: E1/2
Section 20: All
Containing approximately 1,440 acres, more or less.

The total PBU expansion area includes approximately 2,480 acres, more or less.

3. The unitized development and operation of the leases in this unit will reduce the amount of land and fish and wildlife habitat that would otherwise be disrupted by individual lease development. This reduction in environmental impacts and interference with subsistence activity is in the public interest.
4. Expansion of the PBU will not diminish access to public and navigable waters beyond those limitations (if any) imposed by law or already contained in the oil and gas leases in the expansion area.
5. The available geological and engineering data demonstrate that a paying quantities certification is appropriate for the tracts approved for the Initial APA. The data also indicates that the acreage within the Initial APA is underlain by hydrocarbons and known and reasonably estimated to be capable of production or contributing to production in sufficient quantities to justify the formation of the Initial APA within the PBU. The available geological and engineering data also demonstrate that the acreage within the APA Expansion Areas is underlain by hydrocarbons and with the drilling of qualified wells will be known or reasonably estimated to be capable of production or contributing to production in sufficient quantities to justify the automatic expansions of the APA within the PBU as described below.
6. The available geological and engineering data justify formation of the Initial APA. Under the regulations governing formation and operation of oil and gas units (11 AAC 83.301 - 11 AAC 83.395) and the terms and conditions under which these lands were leased from the State of Alaska, the following lands are included in the Initial APA:

Initial Aurora PA

Tract 10, ADL 47448
T. 12N R. 12E UM
Section 23: SW1/4
Containing approximately 160 acres, more or less.

Tract 11, ADL 28256:
T. 12N R. 12E UM
Section 21: E1/2
Section 22: W1/2NW1/4, S1/2
Containing approximately 720 acres, more or less.

Tract 21, ADL 28258:
T. 12N R. 12E UM

Section 27: All
Section 28: E1/2, E1/2W1/2
Section 33: E1/2
Section 34: All
Containing approximately 2,080 acres, more or less.

Tract 22, ADL 28257
T. 12N R. 12E UM
Section 26: All
Containing approximately 640 acres, more or less.

Tract 48, ADL 28261
T. 11N R. 12E UM
Section 3: N1/2
Containing approximately 320 acres, more or less.

The total area within the APA is approximately 3,920 acres, more or less.

7. The formation of the Initial APA divides costs and allocates produced hydrocarbons in a manner acceptable to both the working interest owners and the Division, and sets forth a development plan designed to maximize physical and economic recovery from the Aurora reservoir within the Initial APA.
8. Within 30 days of this decision, the APA operator must submit a revised Tract Allocation Schedule and map of the Initial APA (Exhibit C and Exhibit D to the PBU Agreement), along with the basis for the allocation method and the volume of reserves for each APA tract. Exhibits C and D shall indicate the appropriate Lease and Tract numbers. Exhibit D shall indicate the boundaries of the PBU, the APA and the individual APA Tracts.
9. Within 30 days of this decision, the working interest owners must submit applications to cross assign their interest in the portions of ADL 28255 and ADL 28256 within the approved expansion area, such that their lease ownership will be aligned across the PBU. The Division will allow the lessees to report production from the APA according to the PBU alignment ownership prior to approval of the ownership assignments.
10. The production of APA hydrocarbon liquids may be commingled with other PBU production in surface facilities before custody transfer. Facility sharing reduces the environmental impact of the additional production. Utilization of existing facilities will avoid unnecessary duplication of development efforts on and beneath the surface.
11. The proposed Interim Metering Plan, discussed in Section III (b) 5.1, is acceptable for royalty allocation purposes and for allocating the commingled gas and hydrocarbon liquids production among the participating areas within the PBU. The Division reserves the right to review the well test allocations to insure compliance with the

methodology prescribed in this decision. Such review may include, but is not limited to, inspection of facilities, equipment and well test data.

12. The APA operator shall provide the Division with monthly production allocation reports and well test data for the APA wells by the 20th of the following month. The reports shall include a summary of the production allocated to each well for the month and specific well test data for all tests conducted during the month. The Division reserves the right to request any information it deems pertinent to the review of those reports. Moreover, this approval of the allocation methodology is conditioned upon the operator's agreement to reply promptly and fully to any such requests.
13. The APA is assigned account code PBAU for royalty accounting purposes. All operator reports and royalty reports must reference the new account code. BP shall submit revised operator reports to allocate all pilot test production from the Lease/Tract Well Operations to the APA. The revised operator reports should zero out production from the Aurora reservoir under account codes X014 and X018 and reallocate the production to account code PBAU for the period November 1, 2000 through the present. The Aurora working interest owners shall submit corresponding revised royalty reports for account codes X014 and X018 and new royalty reports for PBAU for the same time period.
14. The 1980 Prudhoe Bay Royalty Settlement Agreement governs the field cost allowance for the state's royalty share of production from the APA.
15. Diligent exploration and delineation of the Aurora reservoir underlying the approved APA is to be conducted by the APA operator under the plans of development and operation approved by the state. Before undertaking any specific operations the unit operator must submit a plan of operations to the Division and other appropriate state and local agencies for review and approval. All agencies must grant the required permits before drilling or development operations may commence. The Division may condition its approval of a unit plan of operations and other permits on performance of mitigating measures in addition to those in the leases if necessary or appropriate. Requiring strict adherence to the mitigating measures will minimize adverse environmental impacts.
16. The Initial Plan of Development for the APA meets the requirements of 11 AAC 83.303 and 11 AAC 83.343. However, BP did not specify a term or expiration date for the APA initial plan of development. The plan is approved for a one-year period from November 1, 2000 through October 31, 2001. The second plan of development for the APA will be due on August 2, 2001, 90 days before the initial plan expires. The second plan must describe the extent to which the requirements of the initial plan were achieved and, if actual operations deviated from or did not comply with the previously approved plan, an explanation of the deviation or noncompliance must be included. It must also provide detailed plans for the term of the second plan and long-range development plans for the APA. 11 AAC 83.343.

17. Subject to the conditions imposed by this paragraph #17, when and if BP drills a Qualified Well in Area 1, Area 2, Area 3, or Area 4 (Expansion Areas) the APA will be automatically expanded to include that specific Expansion Area.

a) The Expansion Areas are described as follows:

Expansion Area 1

Tract 22, ADL 28257

T. 12N R. 12E UM
Section 25: SW1/4
Section 35: All
Section 36: N1/2, SW1/4

Expansion Area 1 contains approximately 1,280 acres, more or less.

Expansion Area 2

Tract 20, ADL 28259

T. 12N R. 12E UM
Section 29: E1/2NE1/4, SE1/4
Section 32: E1/2

Tract 21, ADL 28258

T. 12N R. 12E UM
Section 28: W1/2W1/2
Section 33: W1/2

Expansion Area 2 contains approximately 1,040 acres, more or less.

Expansion Area 3

Tract 11, ADL 28256

T. 12N R. 12E UM
Section 21: W1/2

Tract 12, ADL 28255

T. 12N R. 12E UM
Section 17: SE1/4
Section 20: E1/2E1/2

Expansion Area 3 contains approximately 640 acres, more or less.

Expansion Area 4

Tract 12, ADL 28255

T. 12N R. 12E UM
Section 17: SW1/4
Section 18: SE1/4
Section 19: E1/2
Section 20: W1/2, W1/2E1/2

Tract 20, ADL 28259

T. 12N R. 12E UM
Section 29: NW1/4, W1/2NE1/4

Expansion Area 4 contains approximately 1,360 acres, more or less.

- b) A “Qualified Well” may be a producer or an injector. A “Qualified Production Well” means a well that has been drilled and completed in the Kuparuk formation; and on the basis of well logs, well tests, and other available data and information appears to be capable of producing unitized substances in paying quantities. A “Qualified Injection Well” means a well that has been drilled and completed as an injection well in the Kuparuk formation and reasonably appears on the basis of well logs, well tests, and other available data and information to be capable of being operated as an injection well for the injection or reinjection of substances for repressuring, recycling or enhanced recovery purposes into the Kuparuk formation. In addition, for a well to be a Qualified Well it must be tied into the IPA production facilities and commence sustained production or sustained injection.
- c) The APA will be automatically expanded to include a specific Expansion Area if the Division receives the following notification regarding a Qualified Well:
1. the dates: 1) drilling operations commenced, 2) the well reached “total depth” in the Aurora Reservoir, 3) the well was tied-into the IPA production facilities, 4) BP commenced first production or injection operations, and 5) BP commenced sustained production or injection operations;
 2. the depth of the well and the final bottom hole location, as well as the base of the production or injection zone; and

3. a revised tract allocation schedule and the basis for the allocation method and volume of reserves on each APA tract.
- d) BP must submit the Expansion Area notification to the Division before the 20th day of the month following the month when sustained production of unitized substances from the Expansion Area or sustained injection into the Expansion Area began.
 - e) Upon receipt of proper notification, an expansion of the APA is automatically approved retroactive to the first day of the month in which first production from the Expansion Area or injection into the Expansion Area began.
 - f) The Division will pre-approve Lease/Tract operations for BP to drill wells within the Expansion Areas and perform a one-month production test of each well drilled.
 1. The operator must provide paper and digital copies of all well logs and surveys, the well completion report, and all flow test results, if tested, within 30 days after completion, suspension or abandonment of each well drilled under the pre-approved Lease/Tract operations.
 2. The Operator and lessees will be required to submit operator and royalty reports allocating any test production to the individual lease where the well is located. After an expansion of the APA becomes effective, the operator and lessees will submit revised operator and royalty reports to reallocate all test production according to the revised APA tract allocation schedule and to back-out any production previously allocated under the Lease/Tract operations.
 - g) If a Qualified Well is not completed in Area 3 or Area 4 by September 30, 2002, the area(s) without a well will not be included in the APA, and any part of the PBU Expansion Area that is not held by production will contract out of the PBU. The acreage contracted out of the unit will be maintained in accordance with state statutes, regulations and the lease terms.
 - h) The conditional approval, to automatically expand the APA to include Expansion Areas 1 and 2 if BP drills a Qualified Well, expires on November 1, 2005, five years from the effective date of the Initial APA. After November 1, 2005, the unit operator will be required to submit a new application for approval of any expansion of the APA in accordance with 11 AAC 83.351 and Article 5.3 of the PBU Agreement.

Article 5.4 of the PBU Agreement provides that a participating area will be effective on the first day of the month following approval by the Division or any other date agreed to by the Division

and the working interest owners. In the Application, the unit operator requested that the PBU expansion and formation of the APA be approved effective October 1, 2000, anticipating that sustained production from the Lease/Tract Operations would begin in October. The Division's November 15, 2000 approval of the Lease/Tract Operations provided that the effective date for the APA would be retroactive to November 1, 2000, the first day of the month in which sustained production began from the Lease/Tract Operations. The sixth expansion of the PBU, formation of the Initial APA, and the APA tract allocation schedule are approved effective November 1, 2000.

A person adversely affected by this decision may appeal this decision, in accordance with 11 AAC 02, to Pat Pourchot, Commissioner, Department of Natural Resources, 550 W. 7th Avenue, Suite 1400, Anchorage, Alaska 99501-3561. Any appeal must be received at the above address, or received by fax to 1-907-269-8918, within 30 calendar days after the date of "delivery" of this decision, as defined in 11 AAC 02.040. A copy of 11 AAC 02 may be obtained from any regional information office of the Department of Natural Resources.

Kenneth A. Boyd, Director
Division of Oil and Gas

Date

Attachment: Map of Approved PBU Expansion and APA

cc: Richard Wagner
Dr. Robert O. Bolt
Jim Stouffer, Royalty Accounting
Jim Haynes, Lease Administration
Jim Cowan, Resource Evaluation
Bonnie Robson, Dept. of Law

APA-PBU Expansion F&D 12.19.00.doc

Attachment 1: Map of the Approved PBU Expansion Area and APA

