

KUPARUK RIVER UNIT

**APPLICATION FOR THE
FIFTH EXPANSION OF THE UNIT AREA AND
FOURTH EXPANSION OF THE KUPARUK
PARTICIPATING AREA**

**DECISION AND FINDINGS OF THE COMMISSIONER
ALASKA DEPARTMENT OF NATURAL RESOURCES**

NOVEMBER 30, 1990

AGO 10166446

KUPARUK RIVER UNIT

FIFTH EXPANSION OF THE UNIT AREA AND FOURTH EXPANSION OF THE KUPARUK PARTICIPATING AREA

I. INTRODUCTION AND BACKGROUND

The Kuparuk River Unit is an oil and gas unit located on the Alaska North Slope immediately west of the Prudhoe Bay Unit. This unit was approved by the Alaska Department of Natural Resources on March 26, 1982, effective retroactive to December 1, 1981.

The original application for the Kuparuk River Unit proposed the unitization of 100 State of Alaska leases, all of which were executed on the 1963 version of the Division of Lands (DL-1) lease form. The original unit area consisted of approximately 237,776 acres, and contained about 30 exploratory wells and 40 development wells at the time of approval.

The Kuparuk River Unit Agreement was modeled after the State of Alaska's Standard Unit Agreement form, which provides for operation of the leases within the unit area as a single entity without regard to lease boundaries and diverse ownership of the leases. The unit is operated in conformance with annual plans of development and operation approved by the Department of Natural Resources. ARCO Alaska, Inc. is the Unit Operator of the Kuparuk River Unit.

On December 13, 1981, production commenced from the Kuparuk Formation, the primary producing interval underlying the Kuparuk River Unit. Start-up production was about 100,000 barrels of oil per day.

On March 26, 1984, the Department of Natural Resources approved the first expansion of the Kuparuk River Unit Area to include all or portions of an additional 28 State of Alaska leases. The expanded unit area comprised approximately 294,986 acres. Five of the leases included in that expansion were leased in the State of Alaska Oil and Gas Lease Sale 31 (September 1980), and reserved a net profit share of 30 percent to the State, as well as provided for a 20 percent royalty. The Department of Natural Resources approved the first expansion of the Kuparuk River Unit Area as submitted, conditioned upon the subsequent submittal and state approval of an amendment of the Kuparuk River Unit Agreement to accommodate certain of the terms of the added net profit share leases. The required amendment was submitted to the Department on May 6, 1985, and was approved on May 17, 1985.

On May 31, 1985, a second expansion of the Kuparuk River Unit was approved by the Department to include all or portions of four State

of Alaska leases totaling 11,886 acres. The unit area after this expansion comprised approximately 306,872 acres. Three of the leases included in the second expansion were acquired in the State of Alaska Oil and Gas Lease Sale 39 (May 1983) and reserved a net profit share of 30 percent to the State, as well as provided for a 12.5 percent royalty. The May 31, 1985 Decision was amended on May 29, 1987 to exclude USS 4275 (an unleased federal tract within ADL 355023) from the Kuparuk Participating Area.

On May 13, 1988, a third expansion of the Kuparuk River Unit to include all or portions of an additional three leases totaling 9,568 acres was approved by the Department of Natural Resources. The expanded unit area after the third expansion comprised 316,400 acres. Two of the three leases included within the Kuparuk River Unit Area as a result of this third expansion were net profit share leases acquired in the State of Alaska Oil and Gas Lease Sale 39 (May 1983). These leases, ADL 355024 and ADL 355032, provided for a 30 percent net profit share and 12.5 percent royalty to the State. The third lease included in the third unit expansion, ADL 365501, was acquired in the State of Alaska Oil and Gas Lease Sale 45A (September 1985) and reserves a 16 2/3 percent royalty to the State. Presently, the Kuparuk River Unit contains ten net profit share leases.

On July 27, 1988, a fourth expansion of the Kuparuk River Unit was approved by the Department of Natural Resources to include all or portions of three State leases totaling 10,192 acres for a total Unit Area of 326,592 acres. The three leases, ADL 365520, ADL 365523, and ADL 365524, included within the Kuparuk River Unit Area as a result of the fourth expansion were leases acquired in the State of Alaska Oil and Gas Lease Sale 45A (September 1985). These leases provide for a 16 2/3 percent royalty to the State.

The Kuparuk Participating Area consists of the leases and portions of leases within the Kuparuk River Unit that have been determined to be capable of producing or contributing to production of hydrocarbons from the Kuparuk River Formation in paying quantities. Only leases that are either partially or wholly included within the Kuparuk Participating Area can have oil production from the Kuparuk River Formation allocated to them. Although there are apparently several prospective oil and/or gas reservoirs underlying portions of the Kuparuk River Unit Area, the Kuparuk River Formation is the only hydrocarbon pool that is currently in commercial production. Other potential reservoirs, such as the West Sak sands, so far have not been determined to be capable of production of hydrocarbons in paying quantities.

The initial Kuparuk Participating Area was approved by the Department of Natural Resources on March 26, 1982; the approval was subsequently made retroactive to December 1, 1981. The initial participating area was established simultaneous with, and as a part of the original Kuparuk River Unit Agreement. The Kuparuk

Participating Area presently encompasses 150,390 acres, more or less.

II. APPLICATION FOR THE FIFTH EXPANSION OF KUPARUK RIVER UNIT AREA AND FOR THE FOURTH EXPANSION OF THE KUPARUK PARTICIPATING AREA

On July 23, 1990, ARCO Alaska, Inc., the Unit Operator, on behalf of itself and the Amerada Hess Corporation, Amoco Production Company, BP Exploration (Alaska) Inc., Chevron U.S.A., Inc., Exxon Corporation, Mobil Oil Company, Texaco, Inc. and Union Oil Company of California made application for a fifth expansion of the Kuparuk River Unit Area. The proposed fifth expansion would add one State of Alaska lease, ADL 373301 (Tract 122A) totaling 677 acres, to the Unit for a total expanded Unit Area of 327,269 acres.

This lease, owned jointly by ARCO Alaska, Inc. and BP Exploration (Alaska) Inc., includes the following acreage: T13N R9E, U. M., U. S. Survey 4275. These lands are currently within the exterior boundaries of the Kuparuk River Unit Area and the Kuparuk Participating Area, but are uncommitted to the Kuparuk River Unit Agreement.

ADL 373301 (Tract 122A) was acquired by ARCO and BP Exploration (Alaska) Inc. (BPX) in the State of Alaska Oil and Gas Lease Sale 72A (Oliktok Point) held on January 24, 1989. The November 30, 1989 Notice of Sale for Sale 72A specified that this lease would be required to be committed to the Kuparuk River Unit under the terms of the Kuparuk River Unit Agreement. The lease provides for a 12.5 percent royalty to the State.

The proposed expansion of the Kuparuk River Unit Area would conform and modify provisions of ADL 373301 so that development of the area could be conducted on a unit-wide basis rather than on a lease basis. Approval of the expansion would extend the joint, cooperative exploration and development of the unit area in conformance with approved unit plans of development and operation.

Simultaneous with the submittal of the application to expand the Kuparuk River Unit Area, ARCO submitted an application to expand the Kuparuk Participating Area to encompass certain additional acreage within the Kuparuk River Unit purported to be capable of producing or contributing to the production of hydrocarbons in paying quantities. This application was submitted pursuant to 11 AAC 83.351(c) and Section 6.2 of the Kuparuk River Unit Agreement. The proposed expansion of the Kuparuk Participating Area would add all or parts of thirty-two individual oil and gas leases totaling 41,600 acres to the existing participating area. The expansion of the Kuparuk Participating Area to include these thirty-two leases would result in a total expanded participating area of approximately 191,990 acres.

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Public notice of the proposed Fifth Expansion of the Kuparuk River Unit Area and Fourth Expansion of the Kuparuk Participating Area was published in the Anchorage Times on August 22, 1990 and in the Fairbanks Daily News-Miner on August 24, 1990. Copies of the public notice were provided to interested parties in conformance with 11 AAC 83.311, as well as to the City of Barrow, the North Slope Borough, the Alaska Department of Environmental Conservation, the Alaska Department of Fish and Game, and the Alaska Department of Natural Resources, Division of Land and Water Management.

During the 30 day public notice period allowed under 11 AAC 83.311, no comments were received from the public, interested parties, or State or local agencies.

The proposed effective date of the Fifth Expansion of the Kuparuk River Unit Area and the Fourth Expansion of the Kuparuk Participating Area is the first day of the month following approval by the Commissioner of the Department of Natural Resources, which is 12:01 a.m. December 1, 1990.

III. GEOLOGICAL AND ENGINEERING CHARACTERISTICS, AND PREVIOUS EXPLORATION OF THE PROPOSED EXPANSION AREAS

Staff members of the Division of Oil and Gas met with ARCO, the Kuparuk River Unit Operator, on July 27, 1990 to discuss confidential geological, geophysical, engineering and well information in support of the application proposing expansion of the Kuparuk River Unit Area (KRU) and the Kuparuk Participating Area (KPA). Subsequent to this meeting and at the request of the division, additional confidential information pertinent to the expansion application was provided by ARCO on August 24, 1990 and October 22, 1990. The supplemental information included well test data from the KRU State #1 and KRU State #2 wells, payin quantities calculations for these two wells, well log and Kuparuk Reservoir pressure data from wells in the existing KPA and the proposed expansion area, and net pay maps and cross-sections over the unit area.

Since the third KPA expansion in May 1988, the only new unit wells to have been drilled outside of the current KPA are the KRU State #1 and KRU State #2 wells. Drilling of development wells has occurred in the KRU near the proposed expansion areas (Drillsites 1L, 2K and 3M, and well 34-11-10), but all of these wells are within the current KPA. Four older (pre-1988) exploratory wells exist in the proposed south and southeast expansion areas (West Sak #4, West Sak #5, West Sak #6, and West Sak #10). The geologic and engineering information from these West Sak exploratory wells, as well as the available seismic data, were evaluated along with the KRU State #1 and KRU State #2 well information in order to determine the appropriateness of the proposed expansion.

Upon review of the geological, geophysical and engineering data submitted in support of the proposed addition of ADL 373301 (Tract 122A) into the KRU and KPA, the Department of Natural Resources determines that the inclusion of ADL 373301 (Tract 122A) within the unit and the participating area pursuant to the Kuparuk River Unit Agreement, the terms of the applicable regulations governing formation and expansion 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 is justified.

With respect to the other thirty-one tracts proposed for the KPA expansion, the department's analysis of the currently available data indicates that inclusion of these tracts into the Kuparuk Participating Area as requested in the application is not warranted. All or portions of these tracts may be considered for inclusion into the participating area at a later date if additional information confirming the potential of these lands either to produce hydrocarbons in paying quantities or to contribute to the production of hydrocarbons in paying quantities becomes available.

IV. DISCUSSION OF THE PARTICIPATING AREA DECISION

This discussion excludes those lands (ADL 373301) which are also the subject of the application for expansion of the unit area. They are discussed in Parts V and VI below.

11 AAC 83.351(c) states:

A participating area must be expanded to include acreage reasonably estimated through use of geological, geophysical, or engineering data to be capable of producing or contributing to the production of hydrocarbons in paying quantities, and must be contracted to exclude acreage reasonably proven through use of geological, geophysical, or engineering data to be incapable of producing hydrocarbons in paying quantities, subject to approval by the commissioner. A revised division of interest or formula allocating production and costs must be submitted for approval under 11 AAC 83.371 at the time of expansion or contraction of a participating area. (emphasis added)

11 AAC 83.361 provides:

For the purposes of 11 AAC 83.301 - 11 AAC 83.395, a well will be considered capable of producing hydrocarbons in paying quantities, as defined in 11 AAC 83.395, when so certified by the commissioner following application by the lessee or unit operator. The commissioner will require the submission of data necessary to make the

certification, including all results of the flow test or tests, supporting geological data, and cost data reasonably necessary to show that the production capability of the well satisfies the economic requirements of the paying quantities definition. (emphasis added)

11 AAC 83.395 states:

Unless the context clearly requires a different meaning in 11 AAC 83.301 - 11 AAC 83.395 and in the applicable unit agreements

(4) "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 as a whole may ultimately result in a loss; quantities are insufficient to yield a return in excess of operating costs unless those quantities, not considering the costs of transportation and marketing, will produce sufficient revenue to induce a prudent operator to produce those quantities; (emphasis added)

In evaluating the application for expansion of the participating area, the department examined the geological and engineering characteristics of the actual and estimated reservoirs, the prior exploration activities in the area of concern, the applicants' plan of exploration or development of the area, and other relevant factors, including all factors listed in 11 AAC 83.303(a) and (b).

Based upon its examination of this data, the department must decide whether the evidence confirms that the proposed expansion area is capable of sustained production of unitized substances in paying quantities or capable of contributing to such production in paying quantities and whether it is likely that revenues would be sufficient to induce a prudent operator to develop and produce from the proposed expansion area.

A determination that the proposed expansion acreage is capable of production in paying quantities would rely upon such factors as well test data indicating that most or all wells within this area are capable of sustained production, the realistic and substantiated wellhead value of the production, the operating costs of the well(s), and the taxes and royalty burdens of the production. Similarly, a determination that the proposed expansion area is capable of contributing to the production of hydrocarbons in paying quantities would rely upon a showing that hydrocarbons from the proposed expansion area are being produced from wells in the existing participating area, or that pressure maintenance or

secondary recovery operations are scheduled to occur in the expansion area to support production from the current participating area.

With respect to determining whether the proposed area is capable of paying quantities production, the department has reviewed the available production data, as well as the geological and geophysical data from all wells in the proposed expansion areas. In addition, as has been the practice of the department in paying quantities determinations for lease extension purposes (the lease Habendum clause), the prevailing wellhead price at the time of the paying quantities determination was used to value the reasonably estimated production from the proposed expansion area wells. Based upon its review of the information, including cost data supplied by ARCO, the department concludes that a paying quantities determination is not appropriate for the wells in the proposed expansion areas. Further, the department finds that the proposed expansion areas have not been demonstrated to be capable of either sustained production or contributing to sustained production in sufficient quantities to justify the foreseeable development and production of these areas by a prudent operator.

Independent indirect evidence supportive of these conclusions is provided by the Plan of Development submitted by the Kuparuk River Unit Working Interest Owners. A unit plan of development must be submitted for approval by the Commissioner for all oil and gas units within the State. One of the purposes of these plans is to provide the department with the unit working interest's owners' plans for the exploration and delineation of any land in the unit not included in a participating area. 11 AAC 83.343(a) states:

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 and 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.

The annual updates to the Kuparuk River Unit Plan of Development filed with the department indicate to the department that no such development or further delineation activities for the areas outside of the current Kuparuk Participating Area are currently contemplated. For example, the 1990 Update to the Kuparuk Unit Plan of Development does not anticipate any development activities in the largest area proposed for the KPA expansion, the area to the south of the current KPA. Furthermore, the expansion application provides no indication that there are any specific plans for development activities or further delineation drilling in the proposed expansion areas.

The lack of delineation wells or other conclusive data in tracts within the requested expansion areas to the northeast, northwest, north, east, and the southeast creates a situation in which the reservoir limit cannot be determined, and thus must be estimated using equivocal geologic models, as opposed to sufficient hard data, to verify the quality, extent, and continuity of the reservoir. The applicants have chosen a model which is highly optimistic when applied to the proposed expansion areas. The department, however, must base its decision on the most reasonable interpretation that can be supported by actual data. Adequate economic, geotechnical and engineering data must support an expansion of a participating area.

The evidence reviewed by the department in its determination of a supportable participating area includes (1) the low production rates and the low productivity indices from the KRU State #1 and the KRU State #2 wells; (2) the lack of any sustained, stabilized production, or consistent and reliable pressure data from the West Sak exploratory wells in the southern expansion area; (3) the uncertain timing and lack of commitment of the applicant to development in the expansion areas (especially the southern expansion area); (4) the lack of uniformity in applying the stated reservoir limit concept to all possibly appropriate perimeter areas of the unit; and (5) the lack of well control in the proposed expansion areas to demonstrate the actual lateral extent of the reservoir. In combination, this evidence does not support the expansion of the current Kuparuk Participating Area to include the proposed expansion areas.

Despite the applicant's claim to the contrary, ARCO has not reasonably demonstrated that the expansion areas, as proposed, are appropriate for inclusion into the KPA. Based upon available data and in the absence of either further delineation drilling or a commitment of the working interest owners to develop and produce these areas, the department cannot approve the proposed expansion of the Participating Area to include areas other than that contained within ADL 373301 (Tract 122A).

V. DISCUSSION OF UNIT AREA AND PARTICIPATING AREA EXPANSION DECISION WITH RESPECT TO ADL 373301 (TRACT 122A)

In accordance with the applicable regulations (11 AAC 83.301 - 11 AAC 83.395), the Commissioner will approve an expansion of an existing oil and gas unit if the Commissioner finds that such expansion is necessary or advisable to protect the public interest. In determining whether a proposed expansion is in the public interest, the Commissioner will consider the following criteria: (1) the conservation of all natural resources; (2) the prevention of economic and physical waste; and (3) the protection of all parties of interest, including the State.

Based on the available geological, geophysical and engineering data submitted at the time, Tract 122A was approved for inclusion into the KRU and KPA as part of the Second Expansion of the Kuparuk Unit Area and Kuparuk Participating Area, dated May 31, 1985. When the Commissioner issued the Decision and Findings approving the Second Expansion of the Kuparuk River Unit Area and Kuparuk Participating Area, Tract 122A was an unleased Federal tract, USS 4275, that was erroneously included within the KPA. An Amendment to the May 31, 1985 Decision and Findings, dated May 29, 1987, excluded Tract 122A from the KPA because of its unleased status, but left the tract within the KRU as an unleased federal tract.

After the State of Alaska received patent to this tract, it was offered for lease as part of the State of Alaska Oil and Gas Lease Sale 72A (Oliktok Point) held on January 24, 1989. The Notice of Sale for Lease Sale 72A specified that the lease would be required to be committed to the Kuparuk River Unit under the terms of the Kuparuk River Unit Agreement.

As the department is aware of no information that would alter the Commissioner's May 31, 1985 Decision and Findings approving Tract 122A for inclusion into the KRU and KPA, the terms and conditions under which Tract 122A was leased compelled inclusion in the KRU, and the Tract is currently under lease to ARCO and BP Exploration (Alaska), ADL 373301 (Tract 122A) is justified for inclusion within the unit and the participating area.

VI. FINDINGS AND DECISION

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

1. Based on the available geological, geophysical and engineering data submitted to the State, the terms and conditions of Lease Sale 72A, and discussions with the Unit Operator, the fifth expansion of the Kuparuk River Unit Area as proposed on July 23, 1990 is proper and justified. The

area proper for expansion of the Kuparuk River Unit Area based upon currently available data consists of the following lands:

T13N R9E U.M., U. S. Survey 4275, All (ADL 373301) including Tract C Alaska Tidelands Survey 1259 and excluding Tract B Alaska Tideland Survey 1259 and Tract A Alaska Tideland Survey 1289, 677.15 acres.

The approved Kuparuk River Unit Area as of December 1, 1990 shall be the same as set out in Exhibit A attached to the July 23, 1990 Application to Expand the Kuparuk River Unit Area.

The inclusion of these lands into the Kuparuk River Unit does not alter, modify or amend the terms and conditions of Paragraph 7, Paragraph 37, and Paragraph 38(b) of the lease ADL 373301.

2. Approval of this expansion of the Kuparuk River Unit Area is necessary and advisable to protect the public interest. Ratification of the Unit Agreement by the lessees of ADL 373301 will ensure a fair and equitable return to the State from any production of hydrocarbons from the expanded unit area.

3. The available geological, geophysical and engineering data submitted also justify expanding the Kuparuk Participating Area to include the following lands:

T13N R9E U.M., U. S. Survey 4275, All (ADL 373301) including Tract C Alaska Tidelands Survey 1259 and excluding Tract B Alaska Tideland Survey 1259 and Tract A Alaska Tideland Survey 1289, 677.15 acres.

4. With respect to the other tracts proposed for expansion of the Kuparuk Participating Area (excluding ADL 373301), the available data do not demonstrate either that a paying quantities determination is appropriate for the wells which they contain or that the acreage is capable of sustained production or contributing to sustained production in sufficient quantities to justify their inclusion in the Kuparuk Participating Area.

5. Within 60 days of the effective date of this Decision and Findings, the Unit Operator shall submit to the State updated Exhibits A, B, C, and D to the Kuparuk River Unit Agreement reflecting the approved expansion areas as set out in this Decision and Findings.

6. Diligent exploration and delineation of all reservoirs underlying the approved expansion area (ADL 373301) are to be conducted by the Unit Operator under the Kuparuk River Unit plans of development and operation approved by the State.

7. The economic benefits to the State as a result of unitized development and production of the expanded Kuparuk River Unit Area outweigh the economic costs to the State of approving the expansion.

8. Expansion of the Kuparuk River Unit Area to include the additional lease will provide for the increased conservation of all natural resources including hydrocarbons, gravel, sand, water, wetland and other valuable habitat.

9. Expansion of the Kuparuk River Unit to include the additional lease also will reduce the amount of surface lands and fish and wildlife habitat that would otherwise be disturbed if the area were to be explored and developed on a lease-by-lease basis. This reduction in the impact on the environment and on subsistence activity in the area is in the public interest.

10. Expansion of the Kuparuk River Unit to include the additional lease will not limit or diminish access to public and navigable waters beyond any limitations already contained in the oil and gas leases proposed to be added to the unit area.

11. This expansion of the Kuparuk River Unit Area will be effective as of 12:01 a.m. December 1, 1990.

For these reasons and subject to the conditions and limitations noted, I hereby approve the Fifth Expansion of the Kuparuk River Unit and the Fourth Expansion of the Kuparuk Participating Area with regard to ADL 373301 only.

James E. Eason

James E. Eason, Director
Division of Oil and Gas

Nov. 30, 1990

Date

For: Rod Swope, Commissioner
Alaska Department of Natural Resources

Attachment: Delegation of Authority from Commissioner, Alaska Department of Natural Resources, to Director, Division of Oil and Gas, dated November 30, 1990.

DELEGATION OF AUTHORITY

I hereby delegate to the Director of the Division of Oil and Gas my authority under 11 AAC 83.351 to approve a participating area, my authority under 11 AAC 83.356 to expand /contract a unit area, my authority under 11 AAC 83.361 to certify wells as capable of production in paying quantities, as well as my authority under 11 AAC 83.371 to approve allocation of cost and production formulas.

Dated: November 30 90
Juneau, Alaska

By: Rod Swope
Rod Swope, Commissioner
Department of Natural Resources

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