

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF OIL AND GAS

550 WEST 7TH AVENUE, SUITE 800
ANCHORAGE, ALASKA 99501-3510
PHONE: (907) 269-8800
FAX: (907) 269-8938

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

October 25, 2000

Daryl Kleppin, Commercial Manager
BP Exploration (Alaska) Inc.
P.O. box 196612
Anchorage, AK 99519-6612

RE: Badami Unit Agreement
Findings and Decision of the Commissioner
Approving Contraction of the Badami Sands Participating Area

Dear Mr. Kleppin,

On August 20, 1998, the Commissioner of the Alaska Department of Natural Resources (Commissioner) conditionally approved the formation of the Badami Sands Participating Area (BSPA) within the Badami Unit. The Commissioner's Decision and Finding required the unit operator to "submit an expansion/contraction application by June 26, 2000, so that the BSPA will only include tracts with existing and sanctioned production or injection wells." On June 23, 2000, BP Exploration (Alaska) Inc. (BP), Badami Unit operator, on behalf of itself and Petrofina Delaware, Inc., submitted an *Application to Contract Badami Sands Participating Area* (the Application). The Application included a revised tract participation schedule and a revised map of the BSPA boundary, Exhibits C and D to the Badami Unit Agreement (the Agreement). After reviewing the application and the attached exhibits, Division of Oil and Gas staff determined that the Application did not apply the "circle-quarter-section-intersect" method correctly to determine the contraction area. Division staff met with representatives from BP on August 10, 2000, to discuss the appropriate boundary of the BSPA. BP submitted a *Supplement to Application to Contract Badami Sands Participating Area* with revised Exhibits C and D on August 21, 2000. The following is the Commissioner's Findings and Decision approving the Application.

History

On September 19, 1997, DNR approved the Initial Plan of Development (Initial POD) for the Badami Reservoir with a three-year term, September 24, 1997 through September 24, 2000. BP's Initial POD included plans to drill 38 development wells sanctioned by company

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management--twenty production wells, fifteen water/miscible fluid injection wells, two source water wells and one Class I waste disposal well. The Badami facilities were designed to provide full processing and export capabilities to support a hydrocarbon liquid production rate of 35,000 barrels per day (bpd). The facilities were also planned to process 22.5 million standard cubic feet per day (scfd) of produced gas, 13,600 bpd of produced water, and 30,000 bpd of source water. The Initial POD indicated that sustained production would commence in October 1998, and enhanced oil recovery (EOR) operations were to begin as soon as practicable after production start-up. BP was required to submit for approval a description of a proposed participating area at least 90 days before sustained unit production.

Development drilling commenced in September 1997. On May 15, 1998, BP submitted an *Application for the Formation of the Badami Sands Participating Area within the Badami Unit* (BSPA Application) pursuant to 11 AAC 83.351 and Section 9 of the Agreement. BP submitted additional information to supplement the BSPA Application on June 12, July 10, and July 20, 1998. BP proposed that the BSPA boundary be determined by the "circle-quarter-section-intersect" method based upon anticipated production and injection well target locations, as illustrated in Exhibit D and Attachment 1 to the *Second Supplemental Application*. The "circle-quarter-section-intersect" method was described in the *Second Supplemental Application*. All area substances and all area costs would be allocated based on the bottom hole location of the wells drilled and the actual production from each well. The Commissioner's August 20, 1998 Decision and Findings approved the formation of the BSPA, effective August 1, 1998, with the following conditions:

The Second POD is due on June 26, 2000, ninety days before the Initial POD expires. By June 26, 2000, BP shall submit an application for expansion or contraction of the BSPA. The BSPA must include 'only 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 the production of hydrocarbons in paying quantities.' DNR will review the existing production and injection well locations and BP's proposed Second POD and drilling schedule when we evaluate the expansion/contraction application.

DNR was concerned about the size of the proposed BSPA in relation to the Initial POD and the equitable allocation of production among the leases in the proposed participating area. The geology of the area is very complicated and it had not been thoroughly explored when BP applied to form the BSPA. The initial BSPA boundary was based on BP's target locations for 68 delineation wells although company management had sanctioned only 38 wells. DNR recognized that some of the tracts in the proposed BSPA may not be underlain by hydrocarbons and the reservoir may not be continuous across the field. We also understood that BP might not drill some of the proposed wells and that others may have discouraging results. BP proposed and DNR accepted an allocation methodology based on the bottom-hole locations of the wells

actually drilled. Production was to be allocated only to tracts with producing wells. Because some tracts might not be developed in a timely manner, if at all, BP agreed that when the three-year Initial POD expired, the BSPA would contract to include only those tracts with production or injection wells.

BP submitted the first annual report on the Initial POD on October 5, 1998. BP had drilled eight wells in the first year and production from the BSPA began on August 24, 1998. The lessees' royalty reports indicate that three of the wells produced hydrocarbons in August 1998.

BP's Initial POD included plans to use outside substances as a supply of miscible injectant. DNR's approval of the Initial POD endorsed the concept of using outside substances to maximize production from the Badami reservoir contingent on reaching an agreement on a recovery rate before injection began. The owners of the Endicott oil pool in the Duck Island Unit agreed to sell gas and miscible injectant to the Badami oil pool owners for EOR operations. Under Article 8.6 of the Agreement, any injection of outside substances into a reservoir in the unit area must be approved by the Commissioner as part of a unit plan of development or operation and must also be approved by the Alaska Oil and Gas Conservation Commission (AOGCC). AOGCC issued Administrative Approval 202.38 on August 10, 1998, and Area Injection Order No. 17 on August 26, 1998, which allowed a gas off-take rate of up to 25 million standard cubic feet (mmscf) per day from the Endicott oil pool to supply the Badami oil pool with fuel gas and source gas for EOR operations and the injection of fluids for pressure maintenance and enhanced recovery within the Badami oil pool. On February 1, 1999, DNR approved BP's proposed Amendment No. 1 to the Agreement that provided a recovery rate for dry gas injected into any reservoir within the unit area. Adopting Amendment No. 1 allowed the Badami Unit operator to inject gas from outside the unit area into a participating area within the Badami Unit for the purpose of repressuring or recycling, and permitted gas sales.

On September 15, 1999, BP submitted an annual report on the Initial POD and a proposed Second POD to supersede the final year of the Initial POD. The pace of development drilling was slower than anticipated and, therefore, the start-up production rate was less than the facility design capacity. The production rate declined to less than 2,500 barrels of oil per day (bopd), which was a significant factor in BP's decision to shut-in the field between February 1999 and May 1999, eliminating the risk of freezing the Badami Pipeline. The proposed Second POD anticipated shutting in the field if the winter temperatures dropped below a safe level. BP reported that although gas was first injected in small quantities in December 1998, sustained gas injection was not established until May 1999. On September 17, 1999, DNR approved the Second POD for the period September 24, 1999 through September 23, 2000.

BP submitted a proposed Third Plan of Development (Third POD) on June 23, 2000. BP had drilled only nine qualified wells by that date--seven producers and two injectors. The BSPA produced a total of 2.3 million barrels of oil through May 2000. Production averaged about 2-3 thousand barrels of oil per day (mbod) over the past year. Wind-induced vibrations caused a

crack in the gas supply line from the Endicott facilities in 1999 and pipeline operations were discontinued. BP has no plans to return the pipeline to service. The drill rigs have been removed from the unit area and BP has no plans for further drilling or development of the Badami Reservoir. Under the proposed Third POD, BP will continue production as long as production rates and temperatures remain at safe and economic levels. If production is shut-in to protect the pipeline due to low production during low temperatures, or in the event of difficulties with well or plant operations, BP will evaluate restarting operations if other unit or non-unit fluids can be brought into the facilities. DNR approved the Third POD on August 8, 2000, with a two-year term from September 24, 2000 through September 23, 2002.

BP submitted the Application on June 23, 2000. Although the Commissioner's Decision and Findings required BP to submit an application for expansion or contraction of the BSPA by June 26, 2000, it did not specify a method for determining the appropriate boundaries of the revised participating area. However the decision provided that "DNR will review the existing production and injection well locations and BP's proposed Second POD and drilling schedule when we evaluate the expansion/contraction application." The regulations specify that a participating area must include 'only 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 the production of hydrocarbons in paying quantities.' Since DNR approved the original BSPA area with boundaries determined by the "circle-quarter-section-intersect" method based upon anticipated production and injection well target locations, the same method will be used to define the revised BSPA boundary. Since there are no additional wells proposed in the Third POD, the contraction area is based on the perforated intervals in the nine existing production and injection wells.

Decision

State regulations require that the commissioner consider the following six factors in evaluating a contraction of the unit area: (1) the environmental costs and benefits; (2) the geological and engineering characteristics of the hydrocarbon accumulation or reservoir; (3) prior exploration activities; (4) the applicant's plans for exploration or development; (5) the economic costs and benefits to the state; and (6) any other relevant factors (including mitigation measures) the commissioner determines necessary or advisable to protect the public interest. 11 AAC 83.303. DNR reviewed all of the factors listed in 11 AAC 83.303 in its approval of the formation of the initial BSPA, and the Commissioner's August 20, 1998 Decision and Findings contains a discussion of each factor. The following is a discussion of the factors as they apply to the Application:

- (1) Environmental costs and benefits -- Badami Unit facilities are located on a central pad and all wells have been directionally drilled from that location. Contraction of the BSPA will reduce surface disturbances on the existing pad and preclude the need for any additional pads, thereby benefiting the environment.

(2) Geological and engineering characteristics of the potential hydrocarbon accumulation -- the delineation wells drilled within the BSPA confirmed that the geologic structure of the Badami Reservoir is more complicated than BP anticipated and supports contraction of the participating area.

(3) Prior exploration activities -- BP only drilled nine producers and injectors in the center of the field. Poor hydrocarbon communication and high gravity oil within the reservoir resulted in low production rates and BP's decision not to drill additional delineation wells in the BSPA. The wells drilled to date support the contracted BSPA boundary described in the Application.

(4) The applicant's plans for exploration or development -- The applicant plans to continue production from the existing wells in the BSPA as long as production rates and temperatures remain at safe and economic levels. The applicant has no plans to develop outside the contracted area. The unit operator identified an exploration prospect outside of the contracted BSPA but made no commitment to drill a well to test the prospect in the Third POD.

(5) The economic costs and benefits to the state -- Previously, the state believed that production from the larger area could benefit the state (taxes, royalties)—but that has proved incorrect—the state no longer stands to benefit from inclusion of the contraction acreage in the BSPA. The state also loses the opportunity to release the acreage for so long as it is in the Badami Unit; however, the area contracted out of the BSPA will be available to lease sooner if the contraction is approved. All acreage outside of a participating area on August 1, 2008, the tenth anniversary of the BSPA, will be contracted out of the Badami Unit and will be held in accordance with the terms and conditions of the individual lease.

The Commissioner found that the initial BSPA would: 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 Application will also fulfill the criteria provided in 11 AAC 83.303 as follows:

1) Promote the conservation of all natural resources -- The formation of oil and gas units and participating areas within unit areas to develop hydrocarbon-bearing reservoirs generally conserves hydrocarbons. The contracted participating area provides for efficient, integrated development of the Badami Reservoir. A comprehensive operating agreement and plan of development governing that production helps to avoid duplicative development efforts on and beneath the surface.

2) Promote the prevention of economic and physical waste -- Generally, forming a participating area facilitates the equitable division of costs and allocation of hydrocarbon shares, and provides for a diligent development plan that maximizes physical and economic benefit from a reservoir. Contraction of the BSPA prevents economic and physical waste by eliminating redundant

expenditures for a given level of production. The oil and gas resources can be produced through a single facility infrastructure system. Contraction of the BSPA will improve the efficiency of developing the Badami Reservoir, which has variable productivity across adjoining leases. Marginal economic reserves, which otherwise would not be produced on a lease-by-lease basis, can be produced through the BSPA. Facility consolidation saves capital and promotes better reservoir management for all working interest owners through pressure maintenance and secondary recovery procedures. In combination, these factors allow less profitable areas of a reservoir to be developed and produced while preventing economic and physical waste.

3) Provide for the protection of all parties of interest, including the state -- Contraction of the BSPA seeks to protect the economic interests of all working interest owners of the reservoir as well as the royalty owner.

This decision considers the facts and the administrative record including DNR's September 19, 1997 approval of the Initial Plan of Development, the August 28, 1998 Commissioner's Decision and Findings approving the formation of the BSPA, DNR's September 17, 1999 approval of the Second POD, and DNR's August 8, 2000 approval of the Third POD. Under the authority vested in the Commissioner by Title 38 of the Alaska Statutes and the Alaska Administrative Code, and delegated to the Director of the Division of Oil and Gas by memorandum dated December 21, 1998, I hereby approve the proposed contraction of the BSPA effective September 24, 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 be faxed 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.

Sincerely,

Kenneth A. Boyd, Director
Division of Oil and Gas

cc: Pat Pourchot, Commissioner
Pete Zseleczky, BP Land Manager
Bonnie Robson, Dept. of Law

EXHIBIT C
Badami Sands Participating Area

Participating Area and Tract Participation
(Submitted 8/18/00)

Unit Tract No.	Legal Description Of Unit Tract Acreage Within Participating Area	Section Acreage	Tract Acreage (w/in P.A.)	Allocation	ADL No.	Royalty (%)	ORRI (%)	Royalty Acct. Code	Working Interest Owners And Percentage Interest
2.1	T. 10 N., R. 20 E., Umiat Meridian, Alaska Section 32: SW¼, W½SE¼	240	240	100%	367006	12.5	None	B021	70% BP Exploration (Alaska) Inc. 30% Petrofina
2.2	T. 10 N., R. 20 E., Umiat Meridian, Alaska Section 32: E½SE¼	80	80	100%	367006	14.585	None	B022	70% BP Exploration (Alaska) Inc. 30% Petrofina
4.1	T. 10 N., R. 20 E., Umiat Meridian, Alaska Section 33: E½SW¼, SE¼ Section 34: SW¼	240 160	400	100%	377011	16.67	None	B041	70% BP Exploration (Alaska) Inc. 30% Petrofina
4.2	T. 10 N., R. 20 E., Umiat Meridian, Alaska Section 33: W½SW¼	80	80	100%	377011	14.585	None	B042	70% BP Exploration (Alaska) Inc. 30% Petrofina
6.1	T. 9 N., R. 20 E., Umiat Meridian, Alaska Section 5: NW¼, SW¼, E½NE¼, E½SE¼ Section 8: W½NE¼	480 80	560	100%	367011	12.5	None	B061	70% BP Exploration (Alaska) Inc. 30% Petrofina
6.2	T. 9 N., R. 20 E., Umiat Meridian, Alaska Section 5: E½NE¼, E½SE¼ Section 8: E½NE¼	160 80	240	100%	367011	14.585	None	B062	70% BP Exploration (Alaska) Inc. 30% Petrofina

EXHIBIT C
Badami Sands Participating Area

Participating Area and Tract Participation
(Submitted 8/18/00)

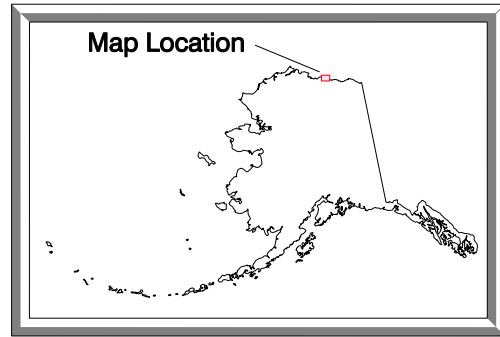
Unit Tract No.	Legal Description Of Unit Tract Acreage Within Participating Area	Section Acreage	Tract Acreage (w/in P.A.)	Allocation	ADL No.	Royalty (%)	ORRI (%)	Royalty Acct. Code	Working Interest Owners And Percentage Interest
7.1	<u>T. 9 N., R. 20 E., Umiat Meridian, Alaska</u> Section 3: All Section 4: NE $\frac{1}{4}$, SE $\frac{1}{4}$, E $\frac{1}{2}$ NW $\frac{1}{4}$, E $\frac{1}{2}$ SW $\frac{1}{4}$ Section 9: NE $\frac{1}{4}$, E $\frac{1}{2}$ NW $\frac{1}{4}$, E $\frac{1}{2}$ SW $\frac{1}{4}$ Section 10: NW $\frac{1}{4}$, SW $\frac{1}{4}$	640 480 320 320	1,760	100%	365533	16.67	None	B071	70% BP Exploration (Alaska) Inc. 30% Petrofina
7.2	<u>T. 9 N., R. 20 E., Umiat Meridian, Alaska</u> Section 4: W $\frac{1}{2}$ NW $\frac{1}{4}$, W $\frac{1}{2}$ SW $\frac{1}{4}$ Section 9: W $\frac{1}{2}$ NW $\frac{1}{4}$, W $\frac{1}{2}$ SW $\frac{1}{4}$	160 160	320	100%	365533	14.585	None	B072	70% BP Exploration (Alaska) Inc. 30% Petrofina
	Total Acreage In Badami Sands Participating Area		3,680					BUBS	






Note: The Badami Sands Participating Area establishes two different royalty rates for those portions of Unit Tracts 2, 4, 6 and 7 which lie within the Participating Area. At the request of the Division of Oil and Gas, those Unit Tracts within the Participating Area which are subject to different royalty rates have been designated as Unit Tracts 2.1, 2.2, 4.1, 4.2, 6.1, 6.2, 7.1 and 7.2.



BADAMI UNIT AGREEMENT

Exhibit D - Boundary Lease Map of the Badami Sands Participating Area



-  Badami Unit Boundary
-  Badami Oil Pool
-  Tract Number
-  Auxiliary Tract Number
-  Badami Sands PA

Submitted 8/15/00

