



April 29, 1988

Mr. N. Shular  
Manager, Engineering  
Unocal Canada Limited  
335 - 8th Avenue, S.W.  
P.O. Box 999  
Calgary, Alberta  
T2P 2K6

Dear Mr. Shular:

AITKEN CREEK FIELD  
APPROVAL TO RECYCLE NATURAL GAS

This refers to the application dated September 9, 1987, by Unocal Canada Limited as operator of the Aitken Creek Field to recycle natural gas in the Aitken Creek Field, and additional information dated November 5, 6, 10, 24, 26, 1987, December 15, 1987, and January 26, 1988.

Under Section 116 of the Petroleum and Natural Gas Act, the approvals for gas cycling dated August 24, 1964, and February 2, 1988, and the approval for concurrent production dated January 9, 1976, are hereby replaced by approval to inject natural gas produced from the Aitken Creek Field back into the "unitized zone" defined in the Unit Agreement to the Aitken Creek Gas Unit No. 1. This is known as a gas cycling or gas recycling scheme. This approval is subject to the following terms and conditions:

1. Aitken Creek Field Definition

"Aitken Creek Field" means the unitized zone defined in the Unit Agreement, Aitken Creek Gas Unit No. 1, effective March 1, 1977, and the non-unitized oil bearing Gething 'A' formation, all restricted to the area of the Aitken Creek Gas Unit No. 1, as shown on Attachment 1.

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In the event Unocal Canada Limited (Unocal) or Hudson Bay Oil and Gas Limited (HBOG) purchase natural gas leases adjacent to the Aitken Creek Gas Unit No. 1, as defined at the date of this Approval, Unocal or HBOG may apply to the Director of Resource Revenue, Ministry of Energy, Mines and Petroleum Resources for approval to include said purchased leases in the area of the Aitken Creek Field, such approval not to be unreasonably withheld where the concurrence of all working interest owners is obtained.

2. Outside Gas Definition

"Outside gas" means marketable gas as defined in the Petroleum and Natural Gas Royalty Regulations (B.C. Reg. 200/85, as amended) that is originally from any source other than the Aitken Creek Field.

3. Native Gas Definition

"Native gas" means any and all unit volumes of natural gas present or produced from the Aitken Creek Field which is in excess of any and all unit volumes of outside gas injected into, produced or disposed of from, the Aitken Creek Field.

4. Royalty Assessment

- a) Native gas and natural gas by-products disposed of from the Aitken Creek Field shall be assessed royalty as per the Petroleum and Natural Gas Royalty Regulations (B.C. Reg. 200/85, as amended).
- b) Oil disposed of from the Aitken Creek Field shall be assessed royalty as per the Petroleum and Natural Gas Royalty Regulations (B.C. Reg. 200/85, as amended).
- c) Outside gas for injection into the Aitken Creek Field shall be assessed royalty in accordance with the Petroleum and Natural Gas Royalty Regulations (B.C. Reg. 200/85, as amended) when first produced prior to injection.

5. Last-In First-Out

Any and all unit volumes of outside gas injected into the Aitken Creek Field (Last-in) shall be any and all unit volumes of residue gas disposed of from the Aitken Creek Field (First-out) until the cumulative volume of residue gas disposed of equals the cumulative volume of outside gas injected. Thereafter, all residue gas disposed of from the Aitken Creek Field shall be from native gas.

6. Method of Operation

(a) At the commencement of gas cycling:

- (i) The wells located at d-25-L, a-53-L, d-57-L, and a-46-L, all in NTS area 94-A-13 shall be used for gas injection and or gas production. The same perforated interval for production will be used for injection in each well.
- (ii) Natural gas shall be produced from the wells located at: d-35-L, d-43-L, d-44-L, d-45-L, and b-43-L, all in NTS area 94-A-13.
- (iii) Natural gas and oil shall be produced from the wells located at: d-33-L, d-34-L, and b-42-L, all in NTS area 94-A-13.

(b) Written notification of intent to change the initial injection and or producing scheme must be submitted to the Director of Engineering and Operations, Ministry of Energy, Mines and Petroleum Resources not less than one month prior to the expected change.

(c) Subsurface pressure surveys shall be performed by the operator at the end of the gas sales phase (est. April or May of each year), to define the minimum reservoir pressure during the 12 month cycle and at the end of the gas storage phase (est. October or November of each year), to define the maximum reservoir pressure during the 12 month cycle.

7. Production Restrictions

An annual allowable of  $138\,700\,10^3\text{m}^3$  is assigned to Aitken Creek native gas disposed of from the Aitken Creek Field.

8. Reserves

The ultimate oil recovery for the concurrent production and blowdown scheme approved January 9, 1976, is set at  $1097\,10^3\text{m}^3$  stock tank.

All oil produced from the Aitken Creek Field up to a cumulative volume of  $1097\,10^3\text{m}^3$  stock tank is old oil and subject to old oil royalty rates.

All oil produced from the Aitken Creek Field in excess of the cumulative volume of  $1097\,10^3\text{m}^3$  stock tank is incremental oil attributed to this gas-cycling scheme and subject to new oil royalty rates.

9. Volume Reporting

- (a) The operator must complete and submit appropriate monthly production and injection reporting S-forms for the approved scheme and shall include the following information:
- i) Volume of raw gas produced per well;
  - ii) Volume of residue gas produced and allocated to each producing well;
  - iii) Volume of residue gas re-injected on a per well basis;
  - iv) Total volume of residue gas disposed of;
  - v) Total volume of marketable gas from other areas injected and allocated on a per well basis;
  - vi) Volume of natural gas by-products produced and allocated to each producing well;
  - vii) Volume of natural gas by-products disposed of;
  - viii) Volume of petroleum produced per well;
  - ix) Total volume of petroleum disposed of and;
  - x) Volume of plant processing fuel used, natural gas flared and lost, and re-injection compressor fuel.

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- (b) Monthly Gas Gathering Operations Reports, Monthly Natural Gas Plant Statements and Monthly Natural Gas Processing Plant Statements shall be filed to report on gas cycling, and gas processing operations.
- (c) An annual review of the approved scheme performance shall be submitted to the Minister 12 months after the commencement of gas cycling and every 12 months thereafter.

10. Termination of Gas Cycling

Written notification of intent to terminate gas cycling must be submitted by Unocal to the Director of Resource Revenue, Ministry of Energy, Mines and Petroleum Resources not less than three months prior to the expected date of termination.

11. Assignment

Unocal and HBOG shall not, without prior consent of the Minister, assign either directly or indirectly this Approval or any right of Unocal or HBOG under this Approval.

Your application to recycle natural gas in the unitized zone of the Aitken Creek Field has been advertised in the British Columbia Gazette and no objections were received. Additional reasonable terms and conditions to this approval may be imposed by the Minister.

Yours sincerely,



Honourable Jack Davis  
Minister

Attachment

bcc: P. Jarman  
J. Allan  
B. Drinkwater  
B. Phillion  
B. Garrison  
B. van Oort  
D. Dempster  
G. German  
P. Ostergaard  
D. Johnson

## UNIT AGREEMENT

## AITKEN CREEK GAS UNIT NUMBER 1

