

STATE OF ALASKA  
OIL AND GAS CONSERVATION COMMISSION  
3001 Porcupine Drive  
Anchorage , Alaska 99501-3192

Re: **The Application of Unocal on behalf ) Conservation Order No. 234A**  
**of the Trading Bay Unit Working )**  
**Interest Owners requesting ) McArthur River Field**  
**commingling of produced fluids ) Hemlock Oil Pool**  
**from the Hemlock, Middle Kenai ) Middle Kenai "G" Oil Pool**  
**"G", and West Foreland oil pools in ) West Foreland Oil Pool**  
**the McArthur River Field.**

December 21, 1993

**IT APPEARING THAT:**

1. By letter dated May 27, 1993, Union Oil Company of California (Unocal) applied for an order allowing commingling of production from the Hemlock, Middle Kenai "G", and West Foreland oil pools.
2. Notice of public hearing was published in the Anchorage Daily News on June 9, 1993.
3. No protests were filed with the Commission.
4. Unocal submitted a Supplemental Engineering Report dated October 27, 1993 containing information relating to the scope of commingling plans, reservoir pressure, allocation methods, crossflow control and waste prevention.

**FINDINGS:**

1. The Hemlock, Middle Kenai "G" and West Foreland oil pools are defined in Conservation Order No. 80.
2. Conservation Order 234, issued October 30, 1987, allows commingling of the Middle Kenai "G" and West Foreland Oil Pools.
3. Unocal's proposed allocation method will be based on production logs. Alternative engineering methods such as historical productivity relationships, individual pool well testing or incremental perforating and testing will be used should well bores become inaccessible to production logging tools.

4. Unocal will evaluate commingling opportunities on a case by case basis. Completion techniques may include single or dual strings depending on local conditions.
5. Average reservoir pressure is estimated at 3120 psig in the Middle Kenai "G", 3430 psig for the Hemlock and 3290 psig for the West Foreland oil pools respectively.
6. Waterflood operations were implemented in February 1969 in the Hemlock oil pool, November 1973 in the Middle Kenai "G" oil pool and December 1987 for the West Foreland oil pool. Each pool waterflood is still in operation. The current injection to production ratios are 1.0 in the Hemlock, 1.5 in the Middle Kenai "G" and 3.0 in the West Foreland oil pools.
7. Estimated additional recovery from commingling ranges from 200,000 to 442,000 barrels of oil for each well. A total of 1.8 million barrels is targeted for recovery by wellbore commingling.
8. Crossflow is not expected to be significant because flowing pressure will be well below reservoir pressure for each pool. Static crossflow may occur but is expected to be minimal because reservoir pressures are relatively close to each other and water injection ratios are higher in the lower pressure pools.
9. The working interest owners of the Trading Bay Unit have integrated their interests through unitization. The royalty owner is the State of Alaska and royalty rate is uniform throughout the three pools.

#### CONCLUSIONS:

1. Commingling the Hemlock, Middle Kenai "G", and West Foreland oil pools may result in recovery of hydrocarbons which otherwise would not be recovered.
2. Produced fluids can be allocated to their respective pools by production logging at periodic intervals or by alternative engineering methods should the well bore become inaccessible.
3. Correlative rights are not jeopardized.
4. Commingling production from the Middle Kenai "G", Hemlock and West Foreland oil pools will not cause waste.
5. Maintaining higher injection ratios in the lower pressure pools and utilizing isolation completion equipment where appropriate will reduce the potential for crossflow between the pools.

**NOW, THEREFORE, IT IS ORDERED THAT**

Rule 1.

Conservation Order 234 is repealed and replaced by this order.

Rule 2.

Commingling of production from the Hemlock, Middle Kenai "G" and West Foreland oil pools in the McArthur River Field is permitted.

Rule 3.

Production logs shall be run within 2 months after initial completion to determine proper allocation of produced fluids. Additional logs should be run after significant changes to well mechanical configurations or abnormal, unexpected changes in well production characteristics. Results and copies of all logs will be filed with the Commission.

Rule 4.

Upon proper application, the Commission may administratively waive the requirements of any rule stated above or administratively amend this order as long as the change does not promote waste, jeopardize correlative rights, and is based on sound engineering principles.

DONE at Anchorage, Alaska and dated December 21, 1993.



*[Handwritten signature of David W. Johnston]*

David W. Johnston, Chairman

*[Handwritten signature of Russell A. Douglass]*

Russell A. Douglass, Commissioner

*[Handwritten signature of Tuckerman Babcock]*

Tuckerman Babcock, Commissioner

Within 20 days after receipt of written notice of entry of this order a person affected by it may file with the Commission an application for rehearing. The Commission shall grant or refuse the application in whole or in part within 10 days. The Commission can refuse an application by not acting within the 10 day period. An affected person has 30 days from the date that the Commission's refusal of the application or order upon rehearing (both being the final order of the Commission) is mailed or otherwise distributed to appeal the decision to the superior court. Where a request for rehearing is denied by nonaction of the Commission, the 30 day period for appeal to superior court runs from the date on which the request is deemed denied (i.e., 10th day after the application for rehearing was filed).