STATE OF ALASKA
ALASKA OIL AND GAS CONSERVATION COMMISSION
333 West 7th Avenue, Suite 100
Anchorage, Alaska 99501

Re: THE APPLICATION OF FOREST OIL CORPORATION for an order authorizing a pilot waterflood project designed to test the potential for enhanced oil recovery in the West McArthur River Oil Pool, West McArthur River Unit, Cook Inlet, Alaska	)	**Enhanced Recovery Injection Order No. 03**
	)	
	)	**West McArthur River Unit**
	)	**West McArthur River Oil Pool**
	)	**Well West McArthur River Unit No. 2A**
	)	
	)	**November 06, 2006**

IT APPEARING THAT:

1. By letter and application dated May 10, 2006, Forest Oil Corporation ("Forest") as Operator of the West McArthur River Unit ("WMRU") requested an order from the Alaska Oil and Gas Conservation Commission ("Commission") to authorize pilot water injection into well West McArthur River Unit No. 2A ("WMRU #2A") to test the potential for enhanced oil recovery under 20 AAC 25.402.
2. Notice of a public hearing was published in the Peninsula Clarion on May 21, 2006, and the Alaska Journal of Commerce on May 28, 2006.
3. No comments, protests or request for public hearing were received during the comment period.
4. The Commission determined it had sufficient information as a basis for ruling, and the tentative public hearing was vacated.

FINDINGS:

1. Operator:

   Forest is operator of the West McArthur River Oil Pool in the WMRU, Cook Inlet, Alaska.

2. Project Location:

   The surface location of well WMRU #2A is 2,804' from the south line and 1,418' from the west line of Section 16, T8N, R14W, Seward Meridian. The bottomhole location is 2,067' from the south line and 2,616' from the east line of Section 10, T8N, and R14W, Seward Meridian. The surface location of the well is onshore on the western side of Cook Inlet and the bottomhole location is approximately 1.5 miles offshore.

3. Operators/Surface Owners Notification:

   Forest provided operators and surface owners within one-quarter mile of the proposed area with a copy of the application for injection. The only affected operator is Forest. The State of Alaska, Department of Natural Resources and the Salamatof Native Association, Inc. are the only affected surface owners.

4. Description of Operation:

   Current development of the field consists of three active production wells in the West McArthur River Oil Pool. The WMRU waterflood pilot project plan includes a single injector, Well WMRU #2A. WMRU #2A is an oil producer that has been shut-in since January 2002. This well produced 2,095,933 barrels of oil.

   Forest proposes to inject produced water from the WMRU along with other Commission-approved sources of water into well WMRU #2A, with the objective of testing enhancing recovery from the West McArthur River Oil Pool. Forest's application did not specify a proposed duration for this pilot project.

5. Geologic Information:

   a. Injection will occur within WMRU #2A into the Hemlock formation ("Hemlock"). Conservation Order 332 defines the West McArthur River Oil Pool as the accumulation of oil and gas that is common to and correlates with the accumulation found in the WMRU No. 1 well between the measured depths of 13,174 and 13,660' (9,292 to 9,632' true vertical depth subsea, or "TVDSS").

   b. The Hemlock is an Oligocene-aged sequence of braided stream deposits consisting of interbedded conglomerates and sandstones, separated by thin interbeds of impermeable claystone and siltstone. The Hemlock ranges from 400 to 500' thick through the proposed pilot project area.

   c. Non-reservoir facies consist of very fine-grained siltstone and generally impermeable carbonaceous claystone and coals.

   d. The planned injection interval ranges from 9,251 to 9,438' ("TVDSS") in WMRU #2A, the same intervals that produced oil.

6. Well Logs:

   The initial formation logs obtained while drilling well WMRU #2A are on file with the Commission.

7. Mechanical Integrity and Well Design of Injection Wells:

   The design and construction of WMRU #2A complies with the requirements of 20 AAC 25.030. The drilling and cementing records from WMRU #2A as well as WMRU #2 were reviewed and found satisfactory to isolate injected fluids to the approved interval.

8. Injection Rates, Pressures, Fracture Propagation:

The initial injection rate will be 3,000 to 4,000 barrels water per day ("BWPD"), and may vary according to production from WMRU wells. The injection rate will be less than the reservoir off-take, but will help minimize reservoir pressure depletion.

The pilot water flood will be operated to prevent fracturing of the confining zone or the Hemlock. The estimated maximum surface injection pressure for well WMRU #2A that will prevent fracturing the Hemlock is 4,430 psi. Operation of the injection well will be at pressures less than that required to initiate or propagate fractures through confining zones.

9. Type of Fluid / Source Water Analysis:

The primary fluid requested for injection is produced water from wells WMRU #5, WMRU #6, and WMRU #7ST1 within the West McArthur River Oil Pool. Compatibility is not an issue since the produced water source is the Hemlock.

In addition to the produced water, Forest is also requesting permission to inject water from the following other sources of water. Osprey platform deck drainage, Osprey platform gray water, Osprey platform treated sanitary waste, produced Hemlock water from the Redoubt Unit, produced Tyonek water from West Foreland, storm water from secondary containment areas around the tank farm at Kustatan Production Facility ("KPF"), and storm water from secondary containment areas round the tank farm at WMRU. Laboratory testing and fluid studies showed no compatibility issues between any of these sources.

10. Freshwater Information:

Salinity analysis of the nearby WMRU #4D disposal well indicates that waters containing less than 10,000 ppm total sodium chloride extend to a depth of approximately 5,000' TVDSS in the project area, or about 4,250' shallower than the proposed injection interval for this operation.

11. Expected Increase in Hydrocarbon Recovery:

The crude oil being produced from the West McArthur River Oil Pool has an API gravity of 27.7 degrees, a gas oil ratio of 235 scf/stb, and a bubble point pressure of approximately 1,400 psia. Primary depletion of this pool from the initial reservoir pressure of 4,095 psia to the bubble point pressure would be expected to result in recovery of 4.5% of the original oil in place ("OOIP"). Recovery to date has been between 31 and 37%, depending on the estimate used for OOIP, which Forest attributes to aquifer pressure support. It is expected that the proposed pilot enhanced oil recovery project will further enhance this pressure support and allow even greater recovery from the pool. Forest reports that other Hemlock water flood projects have resulted in recoveries of as much as 42%. Data acquisition on injection response and recovery benefits is an objective of the pilot project.

12. Mechanical Condition of Adjacent Wells:

There is one well that penetrates the Hemlock within a quarter mile of the WMRU #2A. WMRU #7A penetrates the Hemlock approximately 834' northwest of WMRU #2A. The drilling and cementing records for #7A were reviewed with no indication that the wellbore would provide a conduit that could allow the escape of fluids from the Hemlock.

CONCLUSIONS:

1. The application requirements of 20 AAC 25.402 have been met.
2. A review of the well records indicates that well construction of WMRU #2A and surrounding wells is satisfactory to isolate injected fluids to the Hemlock. Well integrity for WMRU #2A must be demonstrated according to 20 AAC 25.412 (c).
3. Water injection is anticipated to increase recovery.
4. Proper well construction and more than 500 aggregate feet of interbedded siltstone and claystone between the injection interval and water of less than 10,000 ppm sodium chloride will protect any potential underground sources of drinking water.
5. Sufficient information has been provided to authorize pilot water injection into the West McArthur River Oil Pool to evaluate the responsiveness of the West McArthur River Oil Pool to waterflood development.
6. Injection pressure will be maintained to prevent breaching the confining intervals.
7. Injected fluids will be confined within the appropriate receiving intervals by impermeable lithology, cement isolation of the wellbore and appropriate operating conditions.
8. Reservoir and well surveillance coupled with regularly scheduled mechanical integrity tests will demonstrate appropriate performance of the enhanced oil recovery project and disclose anomalous performance.
9. An annual report will keep the Commission apprised of the pilot project's progress.

NOW, THEREFORE, IT IS ORDERED THAT:

The underground injection of fluids for evaluation of enhanced oil recovery is authorized in the WMRU #2A, subject to the following rules and the statewide requirements under 20 AAC Chapter 25 to the extent not superseded by these rules.

Rule 1: Expiration Date

This Order shall expire 24 months after its effective date.

Rule 2: Authorized Injection Strata

The West McArthur River Oil Pool, as defined in Conservation Order 332, is the strata authorized for injection for pressure support and enhanced oil recovery injection.

Rule 3: Fluid Injection Well

Well WMRU #2A is the only well authorized for fluid injection during this pilot project. Well WMRU #2A's bottomhole location is in Section 10, T8N, and R14W, Seward Meridian.

Rule 4: Authorized Fluids for Enhanced Recovery

The only fluids authorized for injection are:

a. Produced water from the West McArthur River Oil Pool of the WMRU;
b. Osprey platform deck drainage;
c. Produced Hemlock water from the Redoubt Unit;
d. Produced Tyonek water from West Foreland;
e. Storm water from secondary containment areas around the tank farms at Kustatan Production Facility and WMRU.

Rule 5: Authorized Injection Pressure for Enhanced Recovery

a. Normal injection pressures must be maintained below the parting pressure of the Hemlock formation.
b. Injection pressures must be maintained so that injected fluids do not fracture the confining zone or migrate out of the approved injection stratum.

Rule 6: Demonstration of Tubing/Casing Annulus Mechanical Integrity

The mechanical integrity of an injection well must be demonstrated before injection begins, and before returning a well to service following a workover affecting mechanical integrity. A Commission-witnessed mechanical integrity test must be performed after injection is commenced for the first time in a well, to be scheduled when injection conditions (temperature, pressure, rate, etc.) have stabilized. Subsequent tests must be performed at least once every four years thereafter (except at least once every two years in the case of a slurry injection well). The Commission must be notified at least 24 hours in advance to enable a representative to witness mechanical integrity tests. Unless an alternate means is approved by the Commission, mechanical integrity must be demonstrated by a tubing/casing annulus pressure test using a surface pressure of 1500 psi or 0.25 psi/ft multiplied by the vertical depth of the packer, whichever is greater, that shows stabilizing pressure and does not change more than 10 percent during a 30-minute period. Results of mechanical integrity tests must be readily available for Commission inspection.

Rule 7: Pilot Project Surveillance

Prior to initiating injection, a baseline temperature survey within WMRU #2A is required from above the West McArthur River Oil Pool to total depth of the well. Within 60 days after injection begins, a step rate test is required. The need for subsequent temperature or step rate tests shall depend on injection performance or notable performance anomalies.

The tubing and casing annuli pressures of each injection well must be monitored at least daily, except if prevented by extreme weather condition, emergency situations, or simi-

lar unavoidable circumstances. Monitoring results shall be documented and made available for Commission inspection.

Information gathered from the pilot, including daily wellhead injection pressures and rates, results of injection surveys, shall be monitored and provided monthly to the Commission until the maximum surface pressure is determined by a step-rate test.

In addition to reporting requirements of 20 AAC 25.432 (1) an annual progress report of pilot operations shall be submitted within 90 days of the project startup anniversary and annually thereafter. The progress report shall contain information regarding project parameters including but not limited to:

a. Reservoir Voidage balance within the project area.
b. Analysis of pressure response and production response.
c. Analysis of injection performance.
d. Analysis of fluid containment surveys, step-rate tests or MIT's that would demonstrate confinement of injected fluids.
e. Review of any specialized tests performed to gauge performance and results of the pilot project.

Rule 8: Notification of Improper Class II Injection

Injection of fluids other than those approved under Rule 4 is considered improper Class II injection. Upon discovery of such an event, the operator must immediately suspend injection, notify the Commission, and provide details of the operation. Additional notification requirements of any other State or Federal agency remain the operator's responsibility.

Rule 9: Well Integrity Failure and Confinement

Whenever any pressure communication, leakage or lack of injection zone isolation is indicated by injection rate, operating pressure observation, test, survey, log, or other evidence, the operator shall immediately notify the Commission and submit a plan of corrective action on a Form 10-403 for Commission approval. The operator shall immediately shut in the well if continued operation would be unsafe or would threaten contamination of freshwater, or if so directed by the Commission. A monthly report of daily tubing and casing annuli pressures and injection rates must be provided to the Commission for all injection wells indicating well integrity failure or lack of injection zone isolation.

Rule 10: Other Conditions

It is a condition of this authorization that the operator complies with all applicable Commission regulations.

The Commission may suspend, revoke, or modify this authorization if injected fluids fail to be confined within the designated injection strata.

Rule 11 Administrative Actions

Unless notice and public hearing is otherwise required, the Commission may administratively waive or amend any rule stated above as long as the change does not promote waste or jeopardize correlative rights, is based on sound engineering and geoscience principles, and will not result in fluid movement outside of the authorized injection zone.

DONE at Anchorage, Alaska and dated November 6, 2006.

John K. Norman
Chairman

Daniel T. Seamount, Jr.
Commissioner

Cathy P. Foerster
Commissioner

AS 31.05.080 provides that within 20 days after receipt of written notice of the entry of an order, a person affected by it Month file with the Commission an application for rehearing. A request for rehearing must be received by 4:30 PM on the 23rd day following the date of the order, or next working day if a holiday or weekend, to be timely filed. 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 on it within the 10-day period. An affected person has 30 days from the date the Commission refuses the application or mails (or otherwise distributes) an order upon rehearing, both being the final order of the Commission, to appeal the decision to Superior Court. Where a request for rehearing is denied by non-action 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).