

September 24, 1999

OIL AND GAS DOCKET NO. 05-0222338

THE APPLICATION OF UNION OIL COMPANY OF CALIFORNIA TO CONSIDER UNITIZATION AND SECONDARY RECOVERY AUTHORITY FOR THE SOUTH VAN RODESSA/UPPER CARLISLE UNIT AND RULE 10 EXCEPTION FOR THE UNIT, VAN (RODESSA) FIELD AND VAN (UPPER CARLILE) FIELDS, VAN ZANDT COUNTY, TEXAS

Heard by: Margaret Allen, Technical Examiner
Marshall Enquist, Hearings Examiner

Procedural History

Application filed: August 6, 1999
Hearing held: September 24, 1999

Appearances

William Black	Representing
Vic Rosato	Union Oil Company of California
Preston Cates	
Burt James	
Dennis P. Kucinkas	
Kitchai Pitiwiwat	
Greg Anderson	

EXAMINERS' REPORT AND RECOMMENDATION

STATEMENT OF THE CASE

Union Oil Company of California ("Unocal") is seeking Commission approval of its unitization agreement and of its plan for secondary recovery in the South Van Odessa/Upper Carlisle Unit in the Van (Rodessa) and Van (Upper Carlile) Field [formation name was misspelled in Commission's field designation], Van Zandt County, Texas. Unocal is also seeking Rule 10 exceptions for each well involved so that the proposed unit can be carried on the Commission's proration schedule in the Van (Rodessa) Field. Unocal also requests cancellation of overproduction for wells in the proposed unit.

DISCUSSION OF THE EVIDENCE

The Van field area was discovered in 1929 and produced half a billion barrels from the Woodbine before the Rodessa and Carlisle formations were developed during the 1970's. The type log shows that both formations are included within the unitized interval that extends from 4799 to 5011 feet in the Unocal 28Crim Lease Well No. 6. The Van fields are found within a large northeast-trending fault block. The proposed unit is in a fault-block separated, from the rest of the Van (Rodessa) and Van (Upper Carlile) Fields to the northeast, by a cross-cutting sealing fault. To the southwest of the proposed unit the fields are bounded by oil/water contacts in the Rodessa and Carlisle. There are smaller faults within the proposed unit but these are not sealing. There are five tracts within the unit, covering 442 acres, and the unit will be waterflooded from the perimeter inward.

The proposed unit produces from a fault block that is separate from other wells in the Van (Rodessa) and (Upper Carlile) Fields. Pressure information shows that the two Rodessa wells in the proposed unit are not in communication with the other two wells carried in the Van (Rodessa) Field. Pressure data also shows that the three Carlisle wells in the proposed unit are in pressure communication with each other but not connected to the other four wells carried in the Van (Upper Carlile) Field. Three of the producing wells will be converted to injection and one injection well will be drilled in the northeast corner. One additional producing well will be drilled as well.

To date, all of the wells in the proposed unit have been completed in only one of the two formations at a time. The two fields will be waterflooded at the same time from the injection wells in the proposed unit. As the rock and fluid properties are similar in both formations, the applicant requests a Rule 10 exception to downhole commingle the production in the producing wells. Cumulative production, from the Rodessa completions in the proposed unit, is 184,000 BO and the remaining primary recovery is estimated to be 209,000 BO. Cumulative production, from the Carlisle completions in the proposed unit, is 281,000 BO and the remaining primary is 199,000 BO.

Primary production will be about 14% of the original oil in place for the Rodessa, and secondary operations will increase the recoverable reserves to 28%. Primary production from the Carlisle will be about 18% of the original oil in place, and waterflooding will increase the total recovery to 39%. Based on a simulation model, applicant believes that waterflooding will produce an incremental 377,000 barrels from the Rodessa and 577,000 barrels from the Carlisle formation. The estimated profit of \$4,708,000 from this incremental oil will exceed the \$1,724,000 cost of the project.

Tract participation is entirely on productive net acre-feet in the largely fault-bounded reservoir. As of the hearing date, 82.9% of the royalty interest had signed the unit agreement, as had 100% of the working interest. The applicant believes that many of the remaining unsigned interest owners will eventually sign the agreement, though many interest owners have such a small percentage of the unit that they may not believe it worthwhile to join. If there remains any unsigned

interest in a tract, Unocal will test the production monthly from that tract and allocate the production separately.

The interests of all owners in the field, whether or not they sign the unit agreement, will be protected. The State of Texas owns no royalty interest in any of the tracts. It is necessary to unitize the acreage in order to conduct an effective waterflood. The persons entering into the unit own interest in the unit and the unit agreement is voluntarily entered into to establish pooled units for a secondary recovery operation. The unit agreement does not bind any interest owner who does not execute it. No one was compelled to enter into the unit agreement.

The unit agreement is subject to all valid rules, orders and regulations of the Railroad Commission. The agreement does not provide for the location of wells nor does the agreement relieve Unocal from its obligation to develop reasonably the leases in the unit. The agreement does not anticipate the use of dry gas in the reservoir. The unit agreement does not attempt to set or include any different field rules from those that already apply to the Van (Rodessa) or to the Van (Upper Carlisle) Fields. Nor does the unit agreement limit the amount of production from the unit properties. The unit agreement does not provide for cooperative refining or marketing of crude petroleum or its by-products. The agreement does not restrict any of the rights which persons now have to pool or unitize.

FINDINGS OF FACT

1. Notice of this hearing was issued on August 19, 1999, to all interest owners in the proposed South Van Rodessa/Upper Carlisle Unit, both signed and unsigned, and to all offset operators.
2. Notice of this hearing was published in the Van Zandt News, a newspaper of general circulation in Van Zandt County, on August 22 and 29, and September 5, 12 and 19, 1999.
3. The proposed unit includes five leases, covering 442 acres with 8117 acre-feet of net pay, bounded to the southwest by oil/water contacts and to the northwest, northeast and southeast by faults.
4. The unit is bounded to the southwest by oil/water contacts.
5. Only acreage that can reasonably be considered productive and that has been reasonably defined by development is included within the unit.
6. Three producing wells will be converted to injection wells, and one additional injection and one additional producing wells will be drilled.
7. The unit is sufficiently large to operate an efficient secondary recovery project.

8. The unit area contains only that acreage reasonably necessary for a waterflood project.
9. Both reservoirs have solution gas drive, which makes the Rodessa and Carlisle formations in the proposed unit good candidates for secondary recovery.
10. Cumulative unit production is 184,000 BO from the Rodessa and 281,000 BO from the Carlisle; the remaining primary oil is 209,000 barrels from the Rodessa and 199,000 barrels from the Carlisle.
11. The anticipated secondary recovery is 954,000 BO which will more than pay for the secondary recovery operations.
12. The State of Texas owns no royalty interest in any of the tracts.
13. The waterflood project will not be successful unless the area is unitized; waterflood operations will sweep hydrocarbons across lease lines.
14. The proposed injection project is expected to produce a reasonable profit: the value of the anticipated additional recovery from the reservoir by means of the secondary recovery program will more than offset the cost of the proposed secondary recovery operation.
15. The rights of the owners of all interests in the field whether or not they join the unit will be protected under the operation of this unit.
16. The owners of interest in the oil and gas under each tract of land within the area reasonably defined by development and capable of inclusion in a contiguous unit have been given an opportunity to enter the unit on the same yardstick basis as the owners of interest in the oil and gas under the other tracts in the unit.
17. To date 100% of the working interest ownership and 82.9% of the royalty interest ownership has signed or ratified the unit agreement.
18. Such agreement does not bind any interest owner who does not execute the agreement.
19. No one was compelled to enter into the unit agreement; the owners of interests not desiring to enter the unit on the yardstick basis may continue to participate in production from the field on an independent basis governed by Commission rules and by the provision of the individual lease contract.
20. The persons entering into the unit own or control production, leases, royalty or other interest in the Van (Rodessa) and Van (Upper Carlisle) Fields.
21. The unit agreement is subject to all valid rules, orders and regulations of the Railroad Commission.
22. The unit agreement does not attempt to contain the field rules for the area or field.

23. The unit agreement does not limit the amount of production.
24. The unit agreement does not provide for cooperative refining or marketing of crude petroleum or its by-products.
25. The agreement was voluntarily entered into to establish pooled units to conduct secondary recovery operations.
26. The unit agreement does not restrict the rights which persons now have to make and enter into unitization and pooling agreements.
27. Such agreement does not provide for the location of wells.
28. The unit agreement does not relieve Union Oil of California from its obligation to develop reasonably its leases committed to the unit.
29. There are no other existing alternate methods or facilities available that are adequate for the purpose of secondary recovery; the unitization agreement is necessary to accomplish the purposes set forth in Section 101.011 of the Texas Natural Resources Code, specifically the establishment of pooled units necessary to effect secondary recovery operations for oil or gas.
30. The unit agreement is in the interest of public welfare as reasonably necessary to prevent waste and promote conservation.
31. The applicant intends to use saltwater from the Woodbine Formation for injection.
32. Production from any tract with unsigned interests will be allocated separately based on monthly well tests.
33. The two formations, the Rodessa and Carlisle, will be flooded jointly from the injection wells.
34. Fluids and rocks are similar in the two formations and downhole- commingling oil from the two formations will not cause waste.
35. Canceling any overproduction from the oil wells will facilitate combining unit production and prevent some wells to be involved in the unit from being shut-in.

CONCLUSIONS OF LAW

1. Proper notice of this application and hearing was provided in accordance with all applicable regulatory statutes and rules.
2. All things have occurred or have been accomplished to afford the Commission the opportunity to consider and decide this matter.

3. Consideration of a secondary recovery program that will prevent the waste of otherwise recoverable hydrocarbon resources is a matter properly within the statutory jurisdiction of the Commission.
4. Approval of the proposed secondary waterflood injection program will foster conservation and prevent waste by providing for the recovery of hydrocarbons that would not otherwise be recovered.
5. The application complies with Chapter 101 of the Texas Natural Resources Code.
6. Because waterflood operations will sweep hydrocarbons across lease lines, a unit agreement is necessary to protect the correlative rights of working interest owners and royalty interest owners.
7. Granting a Rule 10 exception for all wells in the proposed unit will make it easier to allocate production and thus protect correlative rights.

EXAMINERS' RECOMMENDATION

Based on the above findings of fact and conclusions of law, the examiners recommend the approval of the requested unitization and secondary recovery project. The examiners also recommend that a 'blanket' Rule 10 exception be granted for the unit so that all of the wells in the proposed unit can be carried on the Commission's proration schedule in the Van (Rodessa) Field. The examiners also recommend that any overproduction for wells in the proposed unit be canceled.

Respectfully submitted,

Margaret Allen
Technical Hearings Examiner

Marshall Enquist
Legal Examiner

Date of Commission action _____

Exhibits

- G-1 Location map
- G-2 Type log
- G-3 Fault map of Rodessa
- G-4 Fault map of Carlisle
- G-5 East-west cross section
- G-6 Northwest-southeast cross section
- G-7 Northeast-southwest cross section
- G-8 Cross section with oil/water contacts
- G-9 Isochore map Rodessa
- G-10 Isochore map Carlisle
- G-11 Ownership map of wells

- E-1 Reservoir data
- E-2 Rodessa production
- E-3 Carlisle production
- E-4 BHP in Rodessa
- E-5 BHP in Carlisle
- E-6 Mobility ratio
- E-7 Fluid compatibility
- E-8 Rock/fluid compatibility in Rodessa
- E-9 Rock/fluid compatibility in Carlisle
- E-10 Simulation of Rodessa
- E-11 Simulation of Carlisle
- E-12 Results of simulation
- E-13 Primary production uneconomic limit
- E-14 Graph of incremental production
- E-15 Graph of incremental production in Rodessa
- E-16 Graph of incremental production in Carlisle
- E-17 Cost analysis
- E-18 Net acre-feet

- L-1 Notice of publication
- L-2 Unit agreement